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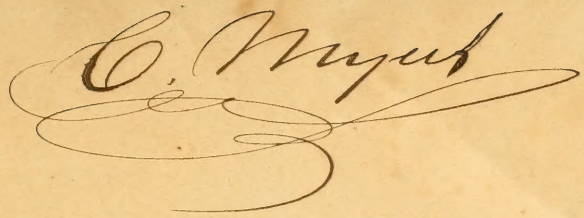

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ARRANGED ACCORDING TO THE CLASSIFICATION OF STARK

EDITED BY A. A. GOULD, M A

WITH FOUR HUNDRED ENGRAVINGS.

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ADVERTISEMENT

The study of Natural History has become so extensive as to call for a great multiplication of books upon the subject. A few years ago, the translation of Buffon, which appeared under the title of "Goldsmith's Animated Nature," was almost the only work in popular use. Even when its utter want of accuracy and adaptation to the improved state of science, was generally known, it still continued to be reprinted, and was probably the instrument of disseminating nearly as much error as truth.

But within a short period, several excellent works have appeared in Europe, combining in a good degree, popular and pleasing descriptions of animals, with scientific accuracy. In the present volume, an attempt has been made to compile from these a more complete and comprehensive body of popular and scientific Zoology than has heretofore appeared, in any form accessible to common readers.

This work is arranged according to the classification of Stark, which is based upon that of Cuvier. Although it embraces scientific names and descriptions, yet these are made to occupy as little compass as possible, and are placed at the foot of the pages in the form of notes. The subject of Zoology is one of great utility, and should be extensively read. The grand object has been to render the work acceptable to general readers, by devoting a large portion of it to lively and entertaining sketches of the habits and instincts of animals; and a large number of books of travels, have been turned over in search of their illustrative traits.

The original compiler having made arrangements to depart for Europe, the manuscript was submitted to the present Editor, who is responsible for the accuracy of the press, for the correctness of the facts selected, and for their arrangement according to the system proposed. The work is now submitted to the public, and though as a systematic work it may not be entirely such as might be

desired, yet the editor is confident that the abundance of authentic facts, and of useful and entertaining matter contained in its pages, will amply repay the reader for the time spent in its perusal.

It has been remarked by an elegant writer, that "the pursuit of Natural History in almost any way, as a study or an amusement, is both indicative and productive of gentleness, refinement and virtue." This we believe to be strictly true, and if the present volume shall be instrumental in diffusing a taste for knowledge, the influence of which is so salutary, we shall deem the labor bestowed upon the compilation as abundantly rewarded.

THE EDITOR.

DIFFERENT RACES OF MEN.

"Naturalists," says Dr. Good, "reckon five races of men." These differ in many features of person and character, as well as complexion, and we will point out the most striking distinctions.

First. The EUROPEAN, or WHITE RACE, is fair, having the cheeks more or less red; the head globular; the face straight and oval; the forehead slightly flattened; the nose narrow, and slightly aquiline; the mouth usually small; the chin full and rounded; the eyes blue or gray, oftener than dark; and the hair, yellow or brown, of different shades, and flowing.

The most perfect of this race may be found in Asia Minor The Circassians and others who live south of the Caucasian mountains, are the most beautiful persons in the world; and it should be remembered, that in this spot of the globe, man was first created This circumstance is of some weight in the conjecture that the original color was white.

Second. The ASIATIC, or BROWN MAN, is yellowish brown or olive; the head is nearly square; the cheek bones wide, and the face flat; the eyes are small and black; the chin rather prominent, and the hair blackish and thin.

Third. The AMERICAN, or RED MAN, is of a copper color; the head is less square, the cheek bones less expanded, and the face less flattened than in the Asiatic; the eyes are deeply seated, and the hair is black, straight and thick

Fourth. The AFRICAN, or BLACK MAN, varies from a deep tawny to a perfect jet. The head is narrow; the face projecting towards the lower part; the forehead arched; the eyes projecting; the nose thick and flat; the lips, particularly the upper one, very thick; the jaws prominent; the chin retracted; the hair black, frizzled and woolly.

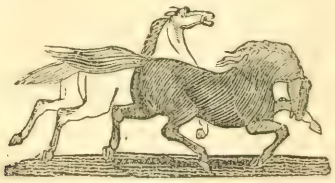
The countenance of the negro is more unlike the European, and more like the monkey, than that of any other variety.

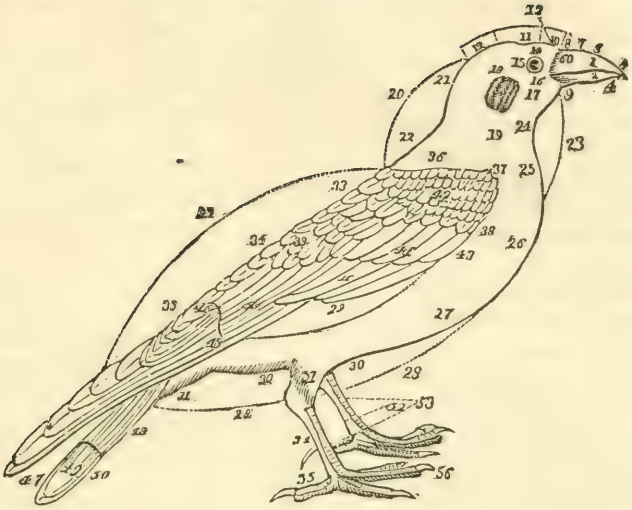
Fifth. The AUSTRALIAN, or TAWNY MAN, is of a mahogany color; the head is narrowed at the upper part; the forehead somewhat expanded; the upper jaws slightly prominent; the nose broad, but distinct; and the hair harsh, coarse, long and curly. This variety inhabits New Holland, and seems to form a middle point between the European and the African.

In this general classification of mankind, two circumstances must be remembered. First, the distinctive characters will not apply to every individual of the particular division to which they belong; swarthy or copper colored persons are often found among the genuine white race; and European features, and sometimes even a fair skin are to be met with in the black and tawny tribes.

In the second place, we must recollect that the frequent migrations among some of the divisions, particularly the Europeans, would cause this race to be widely scattered, and often prominently intermixed with the other races in their own particular divisions of the globe.

Consequently, we are more likely to meet with Asiatics and Africans possessing European features, than to find among the white race the wide cheek bones and flat face of the *brown man* and the flat nose and thick lips of the negro.





PARTS OF A BIRD.

The external parts of a bird, which require to be noticed and distinguished by the naturalist, are the head, neck, body, wings, tail and legs; which parts again are subdivided more or less minutely, according to the taste of various writers on the subject. The above outline engraving is to assist young naturalists in naming these.

1. Maxilla Superior, the upper mandible of the bill.
2. Maxilla Inferior, the lower mandible of the bill.
3. Culmen, the ridge of the bill.
4. Gonys, the angle or point of the under mandible.
5. Dertrum, the hook of the bill.
6. Nares, the nostrils.
7. Mesorhinium, the upper ridge of the bill.
8. Lorum, the bone, a naked space at the base of the bill.
9. Mentum, the chin.
10. Frons, the forehead.
11. Vertex, the crown of the head.
12. Sinciput, the hinder part of the head.
13. Capistrum, the face.
14. Supercilium, the eyebrow.
15. Regio Ophthalmica, the region of the eye.
16. Tempora, the temples.
17. Gena, the cheek.
18. Regio Parotica, the parts above the ear.
19. Collum, the neck.
20. Ceroix, the hinder part of the neck.

21. Nucha, the nape of the neck.
22. Auchenium, the under nape of the neck.
23. Guttur, the throat.
24. Gula, the gullet.
25. Jugulum, the lower throat.
26. Pectus, the breast.
27. Epigastrum, the stomach.
28. Abdomen.
29. Hypochondria, the sides of the abdomen.
30. Venter, the belly.
31. Crissum, the vent.
32. Dorsum, the back.
33. Interscapulum, the space between the shoulders.
34. Tergum, the middle of the back.
35. Uropygium, the rump.
36. Humeri, the shoulders.
37. Flexura, the bend of the wing.
38. Axilla, the arm-pit.
39. Ala, the wing.
40. Tectrices, the wing coverts.
41. Tectrices Majores, the largest wing coverts.
42. Tectrices Minores, the smallest wing coverts.
43. Tectrices Mediæ, the middle wing coverts.
44. Remiges, the rowers.
45. Primariæ, the quills.
46. Secundariæ, secondaries.
47. Cauda, the tail.
48. Rectrices, the tail feathers, divided into,
49. Intermediae, the middle, and,
50. Laterales, the side feathers.
51. Tibia, the thigh answering to the leg in quadrupeds.
52. Planta, or Pes, foot, divided into
53. Tarsus, the shank, answering to the heel in quadrupeds.
54. Acrotarsium, the shin.
55. Hallux, the great toe.
56. Digiti, the toes

ELEMENTS

OF

NATURAL HISTORY.

INTRODUCTION.

The object of Natural History is the material world, and the various classes of organized and inorganic bodies which form its component parts. To examine and arrange these in connection with the laws by which they are governed, to investigate their structure, their history, and their uses, is the province of the Naturalist. In its most extended sense, Natural History embraces all the visible creation, and includes every object in that creation, from the most magnificent of the celestial bodies, to the smallest insect or particle of dust, which is found in the globe inhabited by men. A field so extensive, compared with the limited powers of the human faculties, is too vast for the subject of individual research; and in detail its objects are so numerous, that to possess a knowledge of even a small portion of these, has been considered a competent task for a life spent in investigation.

For this reason it has become matter of necessity to subdivide and arrange the objects of the material world into portions, suitable to the powers and the intelligence of those whose province and interest it is to investigate the wonders of creation. One great branch, termed Natural Philosophy, has thus been divided into numerous departments, of which Dynamics, or the doctrine of the laws of motion and its effects, and its subsidiary divisions, Statics, Hydrostatics, &c., offer a wide field to investigation. The observation of the positions and revolutions of the heavenly bodies has become the province of that branch of Natural Science denominated Astronomy: the nature, motion, and qualities of light, form the science of Optics: the changes that take place in the atmosphere, as they are perceived by the senses, or indicated by instruments, is the object of Meteorology: and it is the province of Chemistry, another great branch of Physical Science,

to investigate the mutual agencies of the elementary principles of matter upon one another, their composition, and the laws by which they are regulated. These divisions of the great field of Natural Science have, from the universality of their influence, been called *General Physics;* while Natural History, in its limited sense, and as confined to the examination of what have been called the three kingdoms of Nature, viz: the Animal, Vegetable, and Mineral, has received the name of *Particular Physics.* Natural History, besides, is distinguished from the other branches of science now named in this, that while Dynamics is a science chiefly of calculation, and Chemistry of experiment, the basis of this science rests chiefly on observation.

In the limited sense in which Natural History is thus to be understood, as confined to the three great divisions of Animals, Vegetables, and Minerals, a System of Nature is a grand catalogue of the objects in these kingdoms, in which each individual has a distinctive character and an appropriate name. These individuals, for the sake of arrangement, are collected into groups, which have something in common, and which are termed *Genera;* genera are further combined into other groups, which form in systems what are called *Orders;* and orders are finally arranged under one great head, which is termed a *Class.* This scale of divisions, of which the highest contains the least, is, as Baron Cuvier remarks, a kind of dictionary, where the properties of things are investigated to discover their names, and which reverses the usual order of such works, where the names are indicated as detailing the qualities of the things named.

But though method and arrangement form the first step to the knowledge of the numerous objects which claim the attention of the naturalist, Natural History is by no means confined to a list of names. If the method be a good one, and the subdivisions arranged conformably to the fundamental and natural connections of bodies, the very arrangement and classification of names of beings which have something in common, leads to the knowledge of their connection and dependence upon one another, and to their comparative importance in the scale of existence. Were it possible to arrange all the classes of organized and inorganized existence in such a manner that the individuals of the same genus should be more nearly connected with that genus than with any other—the genera of the same order more nearly connected with that order than with all the other orders, and so on,—little more would be necessary to make the method, so far as depends on arrangement, complete. But it has not hitherto been found in practice, that

characters sufficiently uniform, and, at the same time, easily cognizable, can be found for arranging all the groups of individuals into closely connected families. Aware of this, Linnæus, in his *Systema Naturæ*, employed one system of organs in his division of its various objects; while those who attempt to class individual species according to what is called the natural method, take the whole structure of the objects into consideration. The last of these methods, it is evident, could it be carried into effect, would be the most philosophical; but either system followed exclusively, is found to produce the most heterogeneous combinations. That system, then, is to be considered the best, which, in addition to short and clear diagnostic characters, affords the greatest facility in investigating the productions of Nature.

The term *Nature*, it may be remarked, bears various significations. It is sometimes used to signify the properties which a being derives from original conformation, in opposition to those which it has acquired from art; sometimes to express the whole objects which compose the universe; at other times, the laws which regulate this universe; and these laws being, in point of fact, the will of that beneficent and omnipotent Being, who formed all this "gay creation," the word Nature is frequently employed, by a figure of speech, to designate its Great Author.

The first great division of natural objects, is into ORGANIZED and INORGANIC bodies; the first, including *animals* and *plants*—the second, *minerals*. These distinctions are easily understood, and have been universally acknowledged to be conformable to nature. Vitality distinguishes the one—the want of vitality characterizes the other.

The objects of Natural History are further arranged into three great divisions, which have appropriately enough been called kingdoms, viz: the ANIMAL—the VEGETABLE—and the MINERAL kingdoms. These divisions are not less proper than convenient; and although some writers believe it possible to trace a continuous but progressive connection, from the most perfect animal in the scale to the inert and lifeless rock, yet there seems no good reason for supposing that such a chain exists, or, if existing, that all the links shall ever be discovered. The works of the Author of Nature are, indeed, all in consistent harmony with one another, and there is a mutual dependence, advantageous to all, among the various classes of organized beings: but between the lowest form of vegetable or animal life, and the most symmetrically disposed crystal in the mineral kingdom—between a living body and inert matter—there is an immeasurable distance; and

between the highest of the lower animals and Man, of all beings, alone endowed with the power of reason and the faculty of speech, a distance still more incalculable.

Animals have been defined to be organized bodies, which have life and sensation, and are capable of voluntary motion;—*Vegetables.* organized bodies, endowed with a vital principle, but wanting sensation;—and *Minerals,* unorganized bodies, without life, and, of course, without sensation.

It has been found impossible to give a satisfactory definition of *Life;* and physiological writers have therefore limited their efforts to communicate some idea of the vital principle, by remarking its effects. Life, where its effects are most easily recognized, seems to consist in the faculty with which certain corporeal combinations are endowed, of existing for a certain period under a determinate form, and assimilating to their substance a part of the surrounding bodies; at the same time restoring to the elements part of their own substance. This vital principle, which, when allied to matter, controls its affinities and directs its forms, is not palpable to the senses in an uncombined shape; and it is only from its effects on material substances, that its existence is demonstrated. Baron Cuvier compares the mechanical action of life on matter to a vortex, more or less rapid, more or less complicated, where the supply and the waste of particles occasion a constant movement. While this movement subsists, the body which exercises it lives; when the movement is stopped beyond recall, the body dies. After death, the elements which composed it, delivered to the ordinary chemical affinities, soon separate, to form other and new combinations.

All living bodies die, after a period, of which the limit is determinate for each species; and death, indeed, appears to be a necessary result of vital action, which insensibly alters the organic structure. The living body, which derives its mysterious birth from another living body which has preceded it, at first enlarges in dimensions, according to certain proportions and limits fixed for each species, and for each of its parts; these parts gradually increase in density; the fibres and vessels which compose them, imperceptibly acquire a rigidity, which unfits them for the discharge of their functions; the vital impulse ceases, and the body naturally dies. In short, absorption, assimilation, exhalation, developement, and generation, are functions common to all living beings; their birth and their death, the universal terms of their existence.

Organization pre-supposes life, and the organization of each being implies the life proper to that being. Life, indeed, is never seen, but in connection with an organized body; and all the ingenuity of the materialist has failed to show, that particles of matter can organize themselves, or be organized by any combination known in chemistry In fact, vitality exercises upon the elements, which form at each instant part of the living body, an action contrary to what the ordinary chemical affinities can produce, without this master agent; and no power in Nature is known, capable of reuniting again, in the same manner, the atoms which have been disjoined by death.

Animal life is distinguished from *vegetable life*, by the power of locomotion and sensation; the first is active—the other passive. The nourishment of plants is derived through the medium of their roots; that of animals, through a central organ of digestion, destined to receive the food. The organization of this cavity and its appurtenances, varies according to the nature of the aliments, and the alterations which they undergo, before furnishing fluids proper to be absorbed; while the atmosphere and the earth supply vegetables with juices, ready for absorption. Animal bodies, besides, at least those classes higher in the scale of existence, possess a circulating system, muscles for voluntary movements, and nerves for sensation. Respiration is another essential function in the animal constitution; and in proportion as the respiratory system is complete, the animal functions are more fully exercised. In addition, also, to the chemical elements, which enter into the composition of vegetables—oxygen, hydrogen, and carbon—a fourth substance, azote, seems almost peculiar to the animal constitution. To complete the distinction between animal and vegetable life, Hedwig has ingeniously remarked, that in vegetables, the sexual organs fall each year, or at each production, while animals preserve them through the whole course of their existence.

As *nutrition* is the most general function of living bodies, under the name of *organs of nutrition*, are comprehended all the parts of the body by which alimentary matters are introduced for its support; or which are employed in preparing the food for that purpose. The materials of nutrition penetrate, by various means, into organized bodies. They may either be introduced under the form of elastic fluids, by the *pores*, or imperceptible interstices, in all living bodies, or they may be conveyed by a particular organization for this purpose, into an internal organ of digestion. Sometimes this internal canal, or digestive cavity, has the form of a tube with two orifices the one for

the entrance of food, the other for the exit of matters unfit for the purposes of life; others have only a single opening, destined to this double use; and a few which are found in water, absorb their nourishment in the manner of vegetables, with this difference, that the canals which run from their numerous mouths, end in a common cavity. The solid matters introduced into the digestive cavity, or stomach, are converted by an internal process, first, into a pulpy mass, named *chyme*, and afterwards, into a semi-fluid substance, denominated *chyle*, which is finally taken up, or absorbed, by appropriate vessels, and conveyed to the great centre of circulation, the heart.

The movement communicated by the action of the *heart* to the internal fluids, now mixed with other animal liquids, and termed blood, by which they are impelled through the body, is known by the name of *circulation*. The vessels which conduct the blood or chyle to the heart, are called *veins;* those which conduct it from the heart to the other parts of the body, are called *arteries;* and the alternate dilatation and contraction of this important organ, is the mechanism by which this object is accomplished. In certain classes of animals, in which the circulation is simple, the venous blood terminates in a kind of reservoir, or appendage to the heart, named *auricle*. A muscular apparatus, attached to this sinus, propels the blood, which it receives through an orifice, into the cavity of the heart. The *ventricle*, composed of thicker and stronger muscular walls, is furnished with move able valves, which prevent the blood from returning into the auricle, while it is impelled by the contraction of the ventricle, into the artery. This arrangement varies much, both in the mechanism and in the number of auricles and cavities in the heart, in different classes, and even in families of the same class of animals.

The liquid, prepared by the process of digestion, requiring to be submitted to the action of the atmosphere, or water containing air, to absorb the oxygen and deprive it of certain principles, the function by which this is accomplished is called *respiration*. The organ which performs this service is the *lungs*, through which the blood is forced by the action of the heart. In animals doomed by their organization to live constantly in water, respiration is effected by means of membranous laminæ, called gills, (*branchiæ*,) which separate the air from the water, as it passes over their multiplied surface.

Among animals which appear to have no true circulation, there exists another mode of respiration, by tracheæ, or air-vessels, by which the air is conveyed through the body in elastic canals; and in these

animals, it is through their integuments, which are soft and easily permeable, or on their surface, that the respiratory function is exercised, as in vegetables.

In many animals, the mode of *generation* is not known. Of others, fixed to solid bodies, like vegetables by their roots, the power of reproduction seems to be by buds, or *gemmæ*, or by means of a separation, which operates naturally or accidentally, of some parts of their bodies, in which are ultimately developed the organs which at first were wanting. In all other animals, there are organs specially destined to generation. These organs distinguish the males from the females. In the greater part of animals, the sexes are distinct and separate, in two different individuals of the same species; but in some classes, the individuals are at once males and females. In this case, these beings are termed *androgynous*. Sometimes, the individuals possess both sexes, like the greater number of vegetables, and they are then called *hermaphrodites*.

The animals which have the sexes separate, differ, also, among themselves. Those are termed *oviparous*, in which the germ of the young individual is separated from the parent for a time before birth, under the form of an egg. *Viviparous* animals, on the contrary, are those in which the young are nourished in an organ, termed the uterus, and are not excluded from the mother till they have taken the form which they afterwards preserve.

Other modifications are noticed among the oviparous animals, or those which deposit eggs. In some, the egg is impregnated within the animal, and then the shell, or covering, is generally solid or corneous. In others, such as fishes, frogs, some insects, and many mollusca, the impregnation of the ovum does not take place till after extrusion. Two remarkable circumstances have been further observ ed, among oviparous animals. The one is, that in some species the ova are not truly excluded, but hatched in the parent animal, who thus preserves the imperfect beings, till they have acquired the requisite solidity for being deposited in a place adapted to their further developement. These species, which are met with in very different classes are termed *ovo-viviparous*. The other singular fact to be noticed in regard to oviparous animals is, that in a very great number of species, the young, when hatched, have neither the form, the structure, nor the manners of the parent animal; and many live in altogether a different medium. These animals undergo, in the course of their limited existence, many organic transformations, or successive metamorphoses.

Such, in particular, are the frogs, and connected genera, and the whole class of insects.

The moving power is another characteristic of animal organization. It is seated in the *muscular fibre*, which is formed of filaments of excessive tenuity, capable of contraction, and of moving the parts upon which they are fixed. These fibres are distributed over the body, and produce all its exterior and interior motions. When they are united in a bundle, of which the mass co-operates in the same action, this bundle is termed a *muscle*. In animal bodies, there are as many different muscles as there are simple movements; and besides, there are generally, for the purpose of bringing back the parts to their original position, other bundles of fibres, destined to produce a contrary effect, and which have been accordingly termed *antagonist muscles*. The element of the muscular fibre, chemically considered, appears to reside in a matter called *fibrine*.

The other organs destined to the purposes of movement, are altogether passive. Sometimes they are disposed outwardly, under the appearance of membranes, or integuments, more or less solid; sometimes under the form of crusts or sheaths, in the interior of which the muscles are placed. The solidity of these parts, their structure, their articulation, and movements, correspond to the animal's mode of life; and these crusts, shells, scales, or sheaths, are of a calcareous or horny nature, and adapted to the efforts they are destined to sustain,—the more soft coverings of this kind, as may be conceived, being only calculated for motion in fluids.

In the higher classes of animals, the solid articulated parts which form the frame-work of the body and modify its form, are almost always placed internally, and serve the purpose of jointed levers, and as a fulcrum for their muscular coverings. These parts are the *bones* of animals, and when arranged as a whole, they are termed the bony skeleton. All these bones meet in a central stalk, or hollow and moveable column, called the *spine*, of which the pieces, more or less solid and numerous, are termed *vertebræ*. Among those which are, on this account, named *Vertebrated Animals*, the column is terminated at one end by the cranium, a bony cavity, inclosing the mass of cerebral matter which gives sensation, and is the seat, generally, of four organs of sense. In the head is also placed the mouth, an instrument capable of prehension, and provided with organs for mechanically dividing the aliment; and often, also, in this important part of animals, the organs are placed which produce or facilitate the action

of respiration. The spine is generally prolonged behind, and forms the tail in many animals.

The mechanical apparatus by which animals acquire the knowledge of what is around them, are termed *organs of sense;* and the impressions made on these by external objects, *sensations.* The medium by which these sensations are conveyed to the brain, the great centre of nervous energy, is through nerves; and the whole apparatus of sensation is termed the *nervous system.* In animals not possessed of a brain, or spinal column, cords, or threads of nervous matter, with thickenings, or ganglions, at certain distances, form their medium of sensation; and although in some groups of animals, composed of soft parts, or of extreme tenuity, the presence of nerves has not been satisfactorily traced, yet there seems little reason to doubt the existence, in a greater or less degree, of the faculty of sensation, in even the lowest of the animal races.

The material substance of animal bodies, in an anatomical view, may be divided into solids and fluids. The solid portions are named *tissues,* and are united, or combined in various degrees, in the animal organs. These tissues have been distinguished by anatomists by their forms, or by the chemical elements which enter into their composition. They are chiefly the following: 1. The *cellular tissue,* forming in the greater number of animals the connecting medium of all their organs, and enveloping and penetrating them by a reticulation, of a spongy nature, which takes the form of cells, capable of distension by the fluids which it includes. 2. The *fibro-gelatinous* tissue is a collection of solid, tenacious, and resisting fibres, in their longitudinal direction, flexible and elastic across, whose use seems to be to communicate movement, and resist the efforts of exterior force. It is so named, from dissolving in boiling water, to the consistence of a jelly. 3. The *membranous tissue* is a disposition of thin, membranous, flexible laminæ, extended like a web, and various in structure and uses. The cutaneous membrane envelopes the superficies of the body, and permits absorption and exhalation. It is formed of many layers, and produces the hair, feathers, nails, scales, &c., of the animal body. Other membranes are called *mucous,* or folliculous, because they secrete a viscid fluid, which lubricates their internal surface; and *serous* membranes are those so named from their internal smooth and polished surface, exhaling a very liquid humor. They form thin and transparent sacs, without openings, which facilitate the reciprocal movements of the organs. 4. The *vascular tissue* is formed of con-

tinuous, membranous, branched tubes, to receive, contain, and direct the nutritive juices, from the organs where they are prepared, till they are required for the purposes of nutrition, respiration, or the secretions. 5. The *glandular tissue* includes those secreting organs which produce fluids for internal use, or to transmit them out of the body, by means of excretory canals. These organs have a granular or lobated form. 6. The *bony tissue*, or cartilaginous, calcareous, and corneous, is formed by the mucous, or gelatinous parenchyma, in which are deposited the hardest and most resisting parts, which protect the body and contribute to its motion. 7. The fibrinous or *muscular tissue* is composed of filaments disposed in bundles, which, from their power of contraction, produce all the movements which characterize animals. 8. The *nervous tissue* is a net-work of filaments and tubes, in the interior of which are found prolongations of the cerebral matter. This tissue, extending from the centre to the circumference, like radii from a centre, is the medium of sensation,—actuates every member through the medium of volition, and connects all the parts of the body by a mutual sympathy.

The animal *fluids* are found in the body under the form of gases, or liquids, of various consistence. The first being absorbed, or exhaled, are but momentarily under this form. The fluids are the chyme, the chyle, the lymph, the blood, and the serous, albuminous, mucous, saline, and other humors, peculiar to different parts of the body.

The simple chemical elements which are found in the animal structure, are among the imponderable agents, caloric, light, and the electric fluids. Among the simple gases, azote, which enters into the composition of many of the tissues; hydrogen, which is one of the elements of lymph, bile, &c.; oxygen, which all animals absorb in the act of respiration; carbon, lime, sulphur, iron, &c., which serve as the base of many salts, formed by carbonic and phosphoric acid.

The instincts and habits of the different classes of animals will be hereafter detailed, in the descriptions of the individual species, whose manners have been most accurately observed. It is sufficient, in this place, to state, that all their motives to action, their migrations, and their instincts, may be traced to the desire of self-preservation, and the impulse of reproduction.

The Vegetable Kingdom is sufficiently distinguished from the animal, as before remarked, by its passive character, by the want of spontaneous motion, and of sensation. Vegetable life is, therefore supported by absorption; and its functions, like those of animals, are

exercised in nutrition, developement, and reproduction. The principal part of the nourishment of plants, is derived from their roots; and their texture is composed of tissues and vessels formed for absorbing, retaining, and elaborating the nutritive juices, drawn from the soil and atmosphere. The vegetable kingdom, likewise, has this analogy among others, with the animal; that the function of reproduction is performed through the medium of sexual organs. These organs are protected by the corolla, or flower; and all the display of color and form in this essential part of vegetables, is, like the notes of many birds, connected with the important purpose of the continuation of the species. The number, form, and situation of these organs, has afforded to Linnæus the chief characters in his simple, though artificial arrangement of the classes and orders of plants, in consequence termed the *sexual system;* while what is called the natural system, proposed by Jussieu, is founded chiefly upon the presence or absence, and the nature of the seed, or germ—the relative position of the stamina—and upon the absence or presence, and form, of the corolla.

The Mineral Kingdom is distinguished from the other two great divisions, by the absence of vitality and organic structure. Forming the solid crust of the globe, the mineral kingdom, in its various compounds, affords support and sustenance to the organized beings existing on its surface. The constitution and arrangement of the mineral strata have given rise to various theories, to account for their present appearance; but facts have not yet been sufficiently multiplied to afford a satisfactory solution. One great line, however, is drawn between those mineral strata which have been termed primitive, in which no organized remains occur, and those of posterior formation, in which the remains of plants and animals are discovered. The principal external characters of the mineral kingdom are taken from their *specific gravity*, as compared with water,—*hardness*,—*crystallization*, when it exists,—and *cleavage*, or the direction of the lamellæ, which, in many minerals, is regulated by the relation of the external surfaces to the primary crystal, or form. Of a less constant kind are color, degree of transparency, fracture, and the streak which many minerals show, when scratched. The physical characters are fusibility, solubility, phosphorescence, electricity, magnetism, and refraction.

Linnæus, in his *Systema Naturæ*, arranged the Animal kingdom into six classes, the Vegetable kingdom into twenty-four, and the Mineral kingdom into three. As this arrangement, though now modified and extended in many of its parts, as will be detailed else-

where, forms the basis of modern classification, and was the first successful attempt at arranging in intelligible order, the various objects of Natural History, its principal divisions are subjoined.*

CLASS FIRST—MAMMALIA.

ORDER I. Primates,
" II. Bruta,
" III Feræ,
" IV. Glires,
" V. Pecora,
" VI. Belluæ,
" VII. Cete.

CLASS SECOND—AVES.

ORDER I. Accipitres,
" II. Picæ,
" III. Anseres,
" IV. Grallæ,
" V. Gallinæ,
" VI. Passeres.

CLASS THIRD—AMPHIBIA.

ORDER I. Reptilia,
" II. Serpentes,
" III. Nantes.

CLASS FOURTH—PISCES.

ORDER I. Apodes,
" II. Jugulares,
" III. Thoracici,
" IV. Abdominales.

CLASS FIFTH—INSECTA.

ORDER I. Coleoptera,
" II. Hemiptera,
" III. Lepidoptera,
" IV. Neuroptera,
" V. Hymenoptera,
" VI. Diptera,
" VII. Aptera.

CLASS SIXTH—VERMES.

ORDER I. Intestina,
" II. Mollusca,
" III. Testacea,
" IV. Lithophyta,
" V. Zoophyta.

THE VEGETABLE KINGDOM

is divided into twenty-four classes, according to the number and position of the stamens; the greater part of the orders, from the number of pistils in the flower; others, by the situation of the seeds, and form of the seed-vessels; in compound flowers, from the arrangement of the florets; and the great class of cryptogamic plants, or plants without conspicuous flowers, form four orders, divided into *Filices*, *Musci*, *Algæ*, and *Fungi*.

THE MINERAL KINGDOM

is divided into three classes, viz: I. PETRÆ; II. MINERÆ; III. FOSSILIA; and numerous subdivisions. But, as the mineral kingdom had attracted but little of the attention of Linnæus, and the progress of chemistry

* Systema Naturæ ed. 12. Holmiæ, 1766.

has since changed the whole science of mineralogy, it is not necessary here, to give the inferior details.

Such is the "field of realities," as M. Lamarck terms it, which the study of Nature offers to the intelligent mind. Life, in all its aspects, is exhibited in countless forms, and the regular succession of organized beings, present the creation in the attractive features of perennial youth. Without herbivorous races, the vegetable kingdom would soon encumber the surface of the globe; without carnivorous animals, the others would multiply beyond their means of support; and provision is made in those tribes, whose food is decomposing substances, to free the earth from dead animal remains. By no conceivable means, could the same amount of existence and happiness be attained; and the whole system is so wonderfully arranged, that among the numberless existences which people the earth, the air, and the waters, there is a constant harmony between the means of existence and the existing beings. While animals, useful to others, are produced in amazing numbers, the fecundity of others, whose physical powers might otherwise give them a superiority, are limited, and species apparently the most defenceless, are provided with means of protection, which insure their perpetuity. To Man alone, as the intelligent head of the whole, is given the dominion over the inferior creatures; his reason has enabled him to apply to his use the whole of the organized and inorganic bodies around him, and left him, within certain limits, the accountable Master of the creation.

On the utility of a knowledge of the objects of Nature, to a being depending on her productions for the supply of all his conveniences and wants, it is scarcely necessary to insist. No species of human learning is so well calculated to form habits of attention and correct observation, as the study of the different branches of Natural History; and none is more admirably adapted to the feelings and capacities of the young. Besides the improvement of the intellectual powers, which the examination of the structure and habits of any class of organized beings is calculated to produce, and the associations likely to be thereby awakened, there is something in the study of Nature which approaches to philosophy of a higher kind—something that, while it teaches man his place in this Creation of Wonders, infallibly leads him to admire the wisdom, and power, and goodness, displayed by its Great Author.

FIRST—THE ANIMAL KINGDOM.

According to Cuvier, there are four principal forms, after which all living beings seem to have been modelled. The basis of these distinctions is laid in the organization of the creatures themselves. Sensation and movement are the characteristics of animals. The heart and the organs of circulation, seem a kind of centre for those functions which may be called vegetative, while the brain and the nervous system, form the principal source of the functions more exclusively animal. Descending from the higher to the lower races of animals, both these systems are found gradually to become more imperfect, and finally to disappear altogether. In the lowest tribes in the scale, where nerves are no longer visible, the muscular fibre also ceases to be distinct, and the organs of digestion are reduced to a simple cavity in the homogeneous mass. In insects, the vascular system disappears, even before the nervous system; but in general, the dispersion of the medullary masses is connected with the agents of muscular motion: a spinal marrow, upon which knots, or ganglia, represent as many brains, or seats of sensation, corresponding to the structure of a body divided into numerous rings, and supported by pairs of limbs, distributed along these annulations. This relative proportion in the structure of general forms, which results from the arrangement of the organs of motion, from the distribution of the nervous masses, and from the energy of the circulating system, constitutes the basis upon which M. Cuvier has founded the principal divisions of the Animal Kingdom.

In the *first* of these general forms, which is that of Man, and the animals which resemble him most nearly, the brain and the principal trunk of the nervous system are inclosed in bony cases; the first called the cranium, the second the vertebræ. To the sides of the vertebral column, as to a centre, are attached the ribs, and the bones of the members which form the frame-work of the body. The muscles, in general, cover the bones, which they put into action, and the viscera are inclosed in the head and trunk. Animals of this form are called Vertebrated Animals, (*Animalia Vertebrata.*)

They have all red blood, a muscular heart, a mouth with two horizontal jaws, distinct organs of vision, hearing, smell, and taste, situated in cavities of the head, and never more than four limbs. The sexes are always separate and the distribution of the medullary masses and the principal branches of the nervous system, is nearly the same in all.

On a close examination of any of the characters of this leading division, some analogy of conformation is always found, even in the species the most

remote from each other; and the gradation of the same general plan is to be traced from Man down to the lowest of the fishes.

In the second conformation, peculiar to animals, there is no internal framework, or skeleton. The muscles are simply attached to the skin, which forms a soft and contractile covering, from which proceed, in many species, stony plates or envelopes, denominated shells, of which the position and production are analogous to that of the mucous body. The nervous system is, with the viscera, included in this general covering, and is composed of many scattered masses, united by nervous threads. The principal of these, placed upon the œsophagus, is denominated the brain. Of the senses, properly so called, the organs of taste and sight are alone to be distinguished, and even these are sometimes wanting. One family alone exhibits the organs of hearing. This division, however, is always characterized by a complete circulating system, and particular organs for respiration; and the organs of digestion and secretion are little less complicated than those of the vertebrated animals. Though the general plan of their organization be not so uniform in regard to external configuration, as the preceding division, yet even between these parts, there is always an analogous resemblance in structure and functions. This division is termed Molluscous Animals, (*Animalia Mollusca.*)

The third general form is that which is observed in insects, worms, &c. Their nervous system consists of *two* long cords, extending along the belly, swelled out at intervals, and uniting into knots, or ganglia. The first of these, placed upon the œsophagus, though held analogous to the brain, is but little larger than the others. The covering of the body is divided by transverse folds, into a certain number of rings, of which the teguments are in some hard, in others soft, but to the interior of which the muscles are always attached. Articulated limbs are often attached to the sides of the annulated portions of the trunk, but it is also frequently destitute of those organs of movements. To these animals, Cuvier has given the name of Articulated Animals, (*Animalia Articulata.*)

In this division is observed the transition from the circulating system in closed vessels, to a nutritive process, by simple imbibition; and also a corresponding transition from respiration, by circumscribed organs, to respiration performed through the medium of tracheæ, or air-vessels, dispersed through the body. The organs of taste and sight, are very evident in the animals of this division. Their jaws, when they have any, are invariably lateral. One family alone possesses the organ of hearing.

The animals comprehended under the fourth general form, are usually known by the name of Zoophytes. They approach, in structure, to the homogeneous character of plants. Neither a distinct nervous system, nor particular organs of sense, are perceptible, and but obscure vestiges of circulation. Their respiratory organs are almost always on the surface of their bodies The intestines of the greater number consist merely in a

cavity, without an outlet. The lowest in the series, which are also the last of the animal tribes, exhibit nothing but a homogeneous pulp, possessed of motion and sensibility. In the preceding divisions, the organs of movement and sense are disposed symmetrically, on both sides of an axis; but in this, they have a circular arrangement, around a common centre. This form of existence Cuvier arranges under the head of RADIATED ANIMALS, (*Animalia Radiata.*)

The term Zoology, includes the whole of the Animal kingdom; besides which, different departments have received particular names; such as *Ornithology*, for the birds; *Ichthyology*, for the fishes; *Entomology*, for insects; and *Conchology*, for the testaceous Mollusca.

FIRST DIVISION.

VERTEBRATED ANIMALS.

THE body of vertebrated animals is sustained by a skeleton, composed of many pieces, connected together and moveable upon one another. The body is composed of a head, a trunk, and limbs. The head is formed of the cranium, which incloses the brain, and of the face, composed of two jaws. In the face are the organs of sense. The trunk is sustained by the spine and ribs. The spine is composed of vertebræ which move upon one another, all of which have a cylindrical opening in the centre, forming together, a canal, containing the portion of nervous matter called the spinal marrow. The ribs are semicircular, and protect the sides of the cavity of the trunk. They are generally articulated, by one extremity, to the vertebral column, and by the other, to the sternum. In some species, they are scarcely perceptible.

The vertebrated animals have never more than two pair of limbs; sometimes, indeed, one or other of these pairs is deficient, and sometimes both. According to the motions to which these limbs are destined to be subservient, the anterior ones assume the form of hands, feet, wings, or fins; the posterior, of feet or fins.

The blood of the vertebrated animals is always red, and seems, by its composition, adapted to sustain energy of sensation and muscular vigor. The correspondence of the blood with the respiration, necessary to the several species of these animals, has suggested their division into classes.

The external organs of sense, in all vertebrated animals, are two eyes, two ears, two nostrils, the teguments of the tongue, and the teguments of the whole body. The nerves unite with the nervous matter in the vertebræ, and terminate in two medullary masses, in the cranium, the volume of which is generally proportioned to the extent of the intellectual capacity.

There are always two jaws, an upper and under one. The principal motion exists in the lower, which has the power of elevation or depression.

In the greater number, the upper jaw is completely fixed and motionless. Both are generally provided with teeth, excrescences of a peculiar nature, similar in chemical composition to bone, but which grow from the jaws by a process of secretion. The jaws of one entire class, however, (that of birds,) and the genus Testudo, in that of reptiles, are invested with a horny substance.

The intestinal canal extends from the mouth to the anus, in various degrees of expansion or contraction. It possesses certain appendices, and receives liquids of a solvent nature, viz: saliva, from the mouth, the secretion of the gland denominated pancreas, and the bile, which is produced by another large gland, the liver. In the passage of the food through the alimentary canal, the part of it adapted to the purposes of nutrition, and termed the chyle, is absorbed by the lacteal vessels, and conveyed into the pulmonary artery, where, in combination with the blood, it undergoes a certain change; and after each portion of the body has received its proper supply, the remainder is carried back into the veins, by a set of vessels analogous to the lacteals, and which, together, form what is usually called the lymphatic system. The veins carry back to the heart the blood which has served the purposes of nutrition. This blood, however, must pass either wholly or partially into the organ of respiration, for the purpose of resuming its arterial character, before it is carried back by the arteries, to the different parts of the body. In the three first classes of vertebrated animals, the organ of respiration consists of lungs, an assemblage of small cells, permeable by the external air. In fishes alone, respiration is performed by gills, or *branchiæ*—a series of laminæ, between which the water passes.

In all vertebrated animals, the blood which furnishes to the liver the materials of the bile, is supplied from the venous blood which has circulated in the intestines, and which, after being reunited in a trunk called the vena portæ, is again divided at the liver, and distributed in ramifications through its substance.

The sexes in this division are always in separate individuals; but the mode in which fecundation is performed, is different in the various classes.

Though, in all these points, the vertebrated animals have a general resemblance, yet the various beings of which this division is composed, present peculiarities, which are the foundation of their arrangement into classes. These differences depend upon the nature and energy of their movements, which again are always proportioned to the quantum of respiration; for upon the perfection of this function, in a great measure, depend the irritability of the muscular fibre, and the energy of the muscular action. The quantity of respiration depends upon the relative portion of blood, contained at every given instant of time, in the lungs, and the amount of oxygen which enters into the composition of the fluid. The quantity of blood is altogether determined, by the peculiar disposition of the organs of respiration and circulation.

The organs of circulation may be double, so that all the blood conveyed by the veins from the different parts, must undergo a process of circulation, before it can be returned by the arteries; or they may be simple, in which case, only a portion of the blood which returns to the body, passes through the lungs. This last is the case with reptiles. The quantity of their respiration, and the qualities depending on it, vary with the relative proportion of blood, returned at each pulsation, into the lungs.

Fishes have a double circulation; but as they respire through the medium of water, and their blood only receives the portion of oxygen in that medium, their quantity of respiration is, perhaps, less than that of reptiles.

In the Mammalia, the circulation is double, and the respiratory process simple. The quantity of their respiration is superior to that of reptiles and fishes. But the quantity of respiration in birds is still greater than that of quadrupeds, because they also respire by various other cavities, as well as the lungs. The air penetrates through their whole body, and acts upon the branches of the aorta, with the same efficiency as upon those of the pulmonary artery.

From these circumstances result four different kinds of motion, among vertebrated animals. Quadrupeds, in whom the quantity of respiration is moderate, are formed for walking and running, and their predominant characteristic is vigor. Birds, whose respiratory system is more extensive, possess the lightness and strength of muscles necessary to support them in their flight. Reptiles, which respire more feebly, creep upon the earth, and many of them pass more or less of their existence in a state of torpor. And fishes, which move in a fluid almost as specifically heavy as themselves, are enabled to execute their movements, by an arrangement altogether different from the others. Every peculiarity of organization proper to each of these classes, and especially such as belong to motion and external sensation, have a close and necessary relation with the characters now enumerated.

CLASS FIRST—MAMMALIA.

Vertebrated Animals, with red and warm blood, breathing through lungs, viviparous, and suckling their young with milk formed in their breasts, or mammæ.

The class Mammalia is placed at the head of the Animal kingdom, not only because it is the class to which Man, considered in his animal structure, belongs, but also because the Mammalia enjoy the most numerous faculties, the most delicate sensations, and the most varied powers of motion. As the quantity of respiration is in mammiferous animals moderate, they are generally formed for walking, and, in consequence, all the articulations of their frame have defined forms, which determine their motions.

Some of the Mammalia, however, can raise themselves in the air, by means of elongated limbs connected by extensible membranes; others have their limbs so much shortened, that they can move with facility only in water; but these circumstances by no means exclude them from the class to which they are allied, by other essential characters.

All the Mammalia have the upper jaw fixed to the cranium; the lower is composed of two pieces, articulated by a projecting condyle to a fixed temporal bone. The neck is composed of seven, and, in one species, of nine vertebræ. The anterior ribs are attached to a sternum, formed of a number of pieces, placed vertically. Their anterior extremity commences at the scapula, which is not articulated to any other bone, but simply suspended in the muscular attachments, and often resting on the sternum, by an intermediate bone, denominated the clavicle. This extremity is continued by an arm, a fore-arm, and a hand, which last is formed of two rows of little bones, called the carpus, of another row named the metacarpus, and of fingers, each composed of two or three bones, called phalanges.

With the exception of the Cetacea, all this class have the first part of the posterior extremity fixed to the spine. This part, in the form of a girdle, or basin, is named the pelvis. In youth, it is divided into three pairs of bones,—the *os ilium*, which is attached to the vertebral column; the *os pubis*, which forms the anterior part; and the *ischium*, which forms the posterior portion. At the junction of these three bones, is the cavity where the bone of the thigh is articulated, to which again is joined the leg, composed of two bones, the *tibia* and the *fibula*. This extremity is terminated by the foot, which is composed of parts analogous to the hand, viz; a tarsus, metatarsus, and toes.

The head, in the Mammalia, is always articulated by two condyles upon the atlas, or first vertebra. The brain is composed of two hemispheres, united by a medullary lamina, called the *corpus callosum*, and contains two ventricles, inclosing four pairs of tubercles, called *corpora striata*, the *thalami optici*, *nates*, and *testes*. Between the *thalami optici* is a third ventricle, communicating with the fourth, situated beneath the cerebellum. The crura of the cerebellum form always under the *medulla oblongata*, a transverse prominence, called *pons Varolii*.

The *eye*, always lodged in its orbit, is protected by two eyelids, and a vestige of a third. Its crystalline lens is fixed by the ciliary processes, and its cellular sclerotic coat.

In the *ear* there is always found a cavity, shut up by a membrane, called the *tympanum*, with four little bones; a vestibule, at the entrance of which one of these bones is placed, and which communicates with three semicircular canals; finally, a spiral canal, termed the *cochlea*, which terminates by one of its canals in the tympanal cavity, and by the other into the vestibule. The cranium is divided into three compartments. The anterior part is formed of the two frontal bones and the ethmoid; the intermediate, by the parietal and the sphenoid bones; and the posterior, by the occipital bone.

Between the occipital, the parietal, and the sphenoid, are inserted the temporal bones, which, to a certain extent, belong to the face.

In the fœtus the occiput is divided into four parts, the body of the sphenoid into two, and three of its pairs of alæ are separate; the temporal bone into three, of which one serves to complete the cranium, another to enclose the labyrinth of the ear, the third to form the walls of its cavity, &c. These portions of the cranium unite more or less quickly, according to the species, and end by perfect union in the adult.

The face is formed by the two maxillary bones, between which the nasal canal passes. Before these, are two intermaxillary, behind two palate bones, and between them descends the single plate of the ethmoid bone, named the *vomer*. At the entrance of the nasal canal are the bones which form the nose. The molar or cheek bone of each side, unites the maxillary to the temporal, and often to the frontal bone; and finally, the lachrymal cavity occupies the internal angle of the orbit, and sometimes part of the cheek.

The *tongue*, in the Mammalia, is always fleshy, and attached to the hyoid bone, which bone is suspended by ligaments to the cranium.

Their *lungs*, two in number, are composed of a mass of small cells, inclosed without adhesion in a cavity formed by the sides of the diaphragm, and lined by the pleura. Their organ of voice is at the upper extremity of the *trachea* or windpipe; and a fleshy continuation, named *velum palati*, establishes a direct communication between their larynx and the back part of their nostrils.

Living on the earth's surface, as do the greater part of the Mammalia, they are exposed to alternations of heat and cold, and their bodies have, in consequence, a covering of hair, which is thicker in the colder, and more scanty in the warmer regions. The Cetacea, which inhabit the sea, are, however, totally destitute of this covering.

The intestinal canal of the mammiferous animals, is suspended by a fold of the peritonæum, called the mesentery, which contains numerous conglobate glands for the lacteal vessels. Another production of the peritonæum, named the epiploon, hangs before and beneath the intestines.

The generation of the Mammalia is essentially viviparous. The fœtus, after conception, descends into the uterus, to the inner surface of which it is attached by means of an arrangement of vessels, termed the *placenta*, through the medium of which, nourishment is derived. The young, for some time after birth, are nourished by a particular secretion of the mother, (milk,) produced in the mammiferous animals, after parturition, and drawn by the young from *mammæ*, or teats. It is from this last character that the term Mammalia has been applied to this class—a character exclusively proper to them, and by which they are more easily recognized than by any other external distinction. The essential characters of the Mammalia are taken from the organs of touch, and the organs of mastication. On the first, depend the power and dexterity of the animal; and from the second

may be deduced the nature of its food, and the consequent structure of its digestive apparatus. On these characters are founded the division of mammiferous animals, into orders.

The degree of perfection of the organs of touch, may be estimated according to the number and mobility of the fingers, and according to the greater or less depth with which their extremities are covered by the nail or hoof. A hoof, for instance, which envelopes that part of the extremity which would otherwise touch the ground, blunts the feeling, and renders the foot incapable of seizing. The opposite extreme is, when only a single lamina covers the upper surface of the end of the finger or toe, leaving to the other all its sensibility. The nature of the food may be judged of by the appearance of the molar teeth, to the form of which the articulation of the jaws always corresponds. For cutting flesh, the teeth require to be edged like a saw, and the jaws to close vertically, like scissors. To bruise grains or roots, it is requisite that the molars have a flat crown; that the jaws should move horizontally, as well as vertically; and that the teeth should be composed of parts of unequal hardness, to give them the necessary inequalities for this operation. The hoofed animals are all necessarily herbivorous, and possess teeth of this description, since the structure of their feet precludes them from seizing living prey.

Animals with unguiculated toes or fingers, on the contrary, are susceptible of more variety in their modes of subsistence; for, besides the form of the molar teeth, they differ materially among themselves in the mobility and delicacy of their toes or fingers. There is one characteristic, however, which exercises a mighty influence on the dexterity of the animals possessed of it, and which multiplies or greatly varies their modes of action. This is the faculty of opposing a thumb to the other fingers, and of thus being enabled to seize with facility the most minute objects. This opposition of a fifth member to the other four, constitutes what is properly called the *hand*, an organ which is carried to the highest degree of perfection in man, in whom alone the anterior extremities are free.

These various combinations strictly determine the nature of the different mammiferous animals, and afford the characteristics from which orders are formed. In the following pages, the Mammalia will be arranged under the following orders:

Order I. BIMANA,	Order VI. GLIRES,
" II. QUADRUMANA,	" VII. EDENTATA,
" III. CHEIROPTERA,	" VIII. PACHYDERMA.
" IV. FERÆ,	" IX. RUMINANTIA,
" V. MARSUPIALIA,	" X. CETACEA.

The total number of mammiferous animals described, according to Desmarest, is about eight hundred and fifty, including, however, many species imperfectly ascertained, and the fossil Mammalia; of which, belonging to the order Quadrumana, are one hundred forty-one,—Cheiroptera, ninety

seven,—Feræ, one hundred seventy-six,—Marsupialia, forty-seven,—Glires, one hundred forty-nine,—Edentata, twenty-four,—Pachyderma, fifty-five,—Ruminantia, ninety-seven,—Cetacea, sixty-two. Of these about three hundred and thirty are frugivorous, or herbivorous; eighty omnivorous; one hundred and fifty, insectivorous, and two hundred and forty, carnivorous, in a greater or lesser degree. The number of terrestrial species domesticated by man, (but perhaps including all that are really useful,) amount only to thirteen.

ORDER FIRST—BIMANA.[1]

MAN.[2]

Man stands alone in the order and genus to which Naturalists have referred his species. Differing widely in physical conformation from al.

[1] *The order Bimana* embraces animals with teeth of three kinds; the posterior extremities proper for walking; the anterior furnished with hands; nails flat; body vertical, two pectoral mammæ; stomach simple; orbital and temporal fossæ distinct.

[2] *Homo sapiens.* The *genus Homo* has four upper and four lower incisor teeth; two upper and two lower canines, one on each side; molars, five above and five below, on each side. The whole number of his teeth, thirty-two.

other classes of animated beings, and distinguished by reason and the power of speech, this wonderfully constructed being seems the bond of connection between the material and immaterial worlds. Possessed of mental powers which raise him beyond the level of the surrounding creation, and connect him with higher orders of existences, man is the only being who looks forward to futurity, and intuitively perceives his connection with and dependence upon the great Source of Intelligence. While the inferior animals enjoy unalloyed the blessings of life and present enjoyment, man combines the past, the present, and the future in his calculations of happiness; and while some parts of his organization connect him with creatures around him, and sober his rule over beings with animal feelings of pleasure and pain as acute as his own, his intellectual powers, unfettered by the material organs which are their instruments, trace the Divinity in all the parts of creation. Hence has arisen the religious feeling among every tribe of human beings, however rude; and man alone, seems to connect himself with the Great Author of his being, through the medium of intellectual homage and worship, according to his conceptions of that Almighty Being, the Creator and Preserver of all.

While reason places man at such an infinite distance from the inferior animals, the faculty of articulate speech, and an artificial language, widen the barrier still further; for although some of the animals possess the power of articulation in a considerable degree, and can communicate by natural signs, significant to those of their own species, they totally fail in those powers which enable man to classify objects, and to employ sounds or signs as an instrument of thought. Brutes possess, indeed, the powers of sensation, perception, and memory, and seem to be capable of intellectual operations to a certain extent; but their action is extremely limited, and bounded to the supply of their bodily wants; and, though susceptible of a species of education, their imitative powers are neither subservient to the improvement of the individual nor his species.

The faculty which seems to direct the inferior animals, in most of their operations, essentially different from any thing like human intelligence, is called *instinct*. This wonderful faculty, surer in its limited aims than reason, bears, however, no proportion to the general intelligence of the animals which exercise it; for it has been remarked, that those in whom the instinctive propensity displays the greatest seeming wisdom and contrivance, upon some occasions, are upon others, remarkably deficient in sagacity.

The physical structure of man, also, widely separates him from the other portions of the mammiferous class. But these variations, in form and proportion, are neither so prominent, nor so totally different in character, from the other animal structures, as to account for the superiority which he enjoys. Destined to be nourished on substances used in common with other animals, the mechanism of his frame must so far correspond with theirs, as to be

able, like them, to convert these substances to the fluids which support his animal life; and his organs of sensation must necessarily be analogous, in some degree, to those of beings on whom the material world is destined to make similar impressions. But no material organs which man possesses, abstracted from the mind of which they are but the instruments, can account for this intellectual supremacy; and those hypotheses which would trace man's intellectual and moral powers to the absolute or relative size of the brain or other material organs, have miserably failed in connecting mind with matter, or thought with organic structure.

The structure of the human frame, however, is wonderfully adapted to the various purposes for which it is destined; and even physically considered, seems the worthy habitation of a being placed at the head, and with the control of animated nature. Man, indeed, considered as an animal, is the only one which walks erect in a vertical position; the only one with hands at the anterior extremity, distinct from the organs of locomotion, and free for executing his purposes. Contrary to what is found in any other mammiferous animal, the structure of his body demonstrates that man is destined to walk erect.

The foot is entirely different from the posterior hand of apes, and furnishes a larger and firmer base than that of any other animal. It would be impossible for man, even if he desired it, to walk on the four extremities, his feet being almost inflexible, and the great length of his thigh would bring his knee to the ground. His shoulders, also, being too much separated, and his arms too far extended from the central line, would produce a very ineffectual support for the upper part of the body. The arteries which supply the human brain, not being subdivided, as in most quadrupeds, the blood necessary for an organ of such volume, would be poured in too copiously and rapidly, if he should assume the horizontal position.

According to Cuvier, no quadruped is comparable to man, for the magnitude of the hemispheres of the brain in proportion to the size of the face. Though the external senses of man are less energetic than in some other animals, they are, however, extremely delicate. His eyes are directed forwards, and thus, though he does not see to both sides of him at once, like most quadrupeds, there is a greater unity in the result of the visual operation. Of all animals, he can best distinguish the various degrees of sound, and he appears to be the only creature whose sense of smell is sufficiently delicate to be affected by unpleasant odors.

Fruits, roots, and succulent vegetables, appear to be the natural food of man. His hands afford him facility in procuring these, and his short and comparatively weak jaws, his canine teeth, scarcely projecting beyond the line of the others, and his tuberculous molar teeth, are little calculated to feed on herbage, or devour flesh, unless those aliments are previously prepared by fire. The organs of digestion in man, are in conformity with

those of mastication. The stomach is simple, the intestinal canal of moderate length, and the large intestines well marked.

The vertebral column, or spine, is composed of thirty-two vertebræ, seven of which are denominated cervical, twelve dorsal, five lumbar, five sacral and three coccygeal. Of the ribs, seven pairs are attached to the sternum, or breast bone, by cartilaginous productions, and are called true ribs. The other five pairs are called false ribs. The male of the human species seldom exceeds six feet in height; the female is generally a few inches less.

At his birth, the INFANT is exposed to a new element, the air. What the sensations are on the admission of this element into the lungs, it is impossible to guess; but from the cries of the infant, we may conjecture that it is attended with pain. The eyes of an infant are indeed open, but they are dull, and appear to be unfitted for the performance of any office whatever; and their outward coat is wrinkled. The same reasoning will apply to most of the other senses. It is not till after forty days that it begins to smile; nor is it till then that it begins to weep: its former sensations of pain are unaccompanied with tears. The length of an infant, at birth, is twenty-one inches, though some do not exceed fourteen; and it generally weighs eight, and sometimes fourteen pounds. The form of the body and limbs of a new-born infant, are by no means perfect. Formerly, infants as soon as born, were injudiciously and unnaturally laced with bandages; so that they were not able to move a single joint. Nations which we call barbarous, act more rationally and more humanely in this respect. The Siamese, the Indians, the Japanese, the negroes, the savages of America, lay their infants naked in hanging beds of cotton, or in cradles lined with fur.

The eyes of children always seek the light, and if only one eye be directed to it, the other will probably become weak; both eyes ought, therefore, to be equally shaded or equally exposed. Squinting is commonly the effect of injudicious treatment in this respect.

In teething, the cutting of the first set generally commences about the sixth or seventh month, and ends between the second and third year. The order of cutting is generally as follows:—First, the two middle *incisors*, or cutting teeth of the lower jaw; then, after an interval of three or four weeks, the upper corresponding incisors follow. The two *canine*, or stomach teeth below, one on each side, next declare themselves; and these are followed by the eye teeth, in the upper jaw. Soon after, the two first *molars*, or grinders, one on each side, succeed to the canine, in the lower jaw; those above them follow. After the lapse of from four to six years, four more grinders are added in each jaw; these are permanent. At the age of puberty or later, the *dentes sapientiæ*, or wisdom teeth appear.

The hair of most infants is exceedingly light, almost white. The body, during infancy, is said (perhaps erroneously) to be less sensible of cold than

during any other season of life. The pulse is certainly strong, and it is therefore fair to conclude, that the internal heat is considerable. Till the age of three years, the life of infants is extremely precarious; in the course of the ensuing second and third years, it becomes more certain, and at six or seven, a child has a greater probability of living than at any other period of life. It is remarked, that of a certain number of children born at the same time, above a fourth die in the first year, above a third in two years, and at least one half in three years. By other calculations, it appears that one half of the children born at the same time, are not extinct in less than seven or eight years.

At twelve or fifteen months, infants begin to lisp. The broad sound of A, is the first sound which they articulate with most ease. Of the consonants, B, M, P, T, are most easy. In every language, therefore, *baba*, *mama*, *papa*, are the first words that children learn. Some children pronounce distinctly in two years, though the generality do not talk for two years and a half, and frequently not so early.

Some persons cease growing at fourteen or fifteen, while others continue their growth to twenty-two or twenty-three. In men, the body attains its perfect proportion at the age of thirty, and in women sooner. The persons of women are, indeed, generally complete at twenty. The distance between the eyes is less in man than in any other animal; in some creatures, in fact, the eyes are at so great a distance, that it is impossible they should ever view the same object with both eyes at once. Men and apes are the only animals that have eyelashes on the lower eyelid. Other animals have them on the upper, but want them on the lower lid. The upper lid rises and falls, the lower has scarcely any motion.

The ancients erroneously considered the hair as a kind of excretion, and believed that, like the nails, it increased by the lower part putting out the extremity; but the moderns have discovered that every hair is a tube, which fills and receives nutriment, like the other parts of the body. The roots, they observe, do not turn gray sooner than the extremities, but the whole changes color at once. Instances have been known, of persons who have grown gray in one night.

There is little known exactly with regard to the proportions of the human figure; and the beauty of the best statues is better conceived by observation than by measurement. Some, who have studied after the ancient masters, divide the body into ten times the length of the face, and others into eight. They tell us that there is a similitude of proportion in different parts of the body: thus, that the hand is the length of the face; that the thumb is the length of the nose; that the space between the eyes is the breadth of the eye; that the breadth of the thickest part of the thigh is double that of the thickest part of the leg, and treble the smallest; that the arms extended are as long as the figure is high.

The strength of man is very considerable, when matured by practice. We are assured that the porters of Constantinople carry burthens of not less weight than nine hundred pounds; and Mr Desaguliers tells us of a man, who by distributing a certain number of weights, in such a manner that every part of his body bore its share, was able to support a weight of two thousand pounds, in an upright posture.

The strength of a man may be still farther estimated by the continuance of his labor, and by the agility of his motions. Men who are exercised in running, outstrip horses, or at least continue their speed for a greater length of time. In a journey, also, a man will walk down a horse; and after they have proceeded together for several days, the horse will be quite tired, and the man will be as fresh as at the beginning. The royal messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen or fifteen hours. Travellers assure us that the Hottentots outrun lions in the chase; and that the savages who hunt the elk, pursue with such speed this animal, which is as fleet as a stag, that they at last tire it down and take it.

When the constitution of the body is sound, it is probably possible, by moderation in the passions, temperance, and sobriety, to lengthen out the period of LIFE for a few years. But even of this there seems an uncertainty. Men no doubt there are, who have passed the usual period of human existence; and, not to mention Parr, who lived to the age of one hundred and fifty-two, and Jenkins, to that of one hundred and sixty-nine, as recorded in the Philosophical Transactions, we have many instances of the prolongation of life to one hundred and ten, and even to one hundred and twenty years Yet this longevity was occasioned by no peculiar art or management. On the contrary, it appears that the generality of such long livers were peasants, accustomed to the greatest fatigues, huntsmen, or laborers; men, in fact, who had employed their whole bodily strength, and even abused it, if to abuse it be possible, otherwise than by continual idleness and debauchery.

If, in the duration of life, there is any difference to be found, it ought seemingly to be ascribed to the quality of the air. In elevated situations, it has been observed, there are commonly found more old people than in such as are low. The mountains of Scotland and Wales, of Auvergne and Switzerland, have furnished more instances of extreme longevity, than the plains of Holland or Flanders, of Germany or Poland. In general, however, the period of human existence may be said to be the same in every country. If not cut off by accidental diseases, man is found to live to the years of ninety or a hundred. Beyond that date our ancestors did not live; nor has it in any degree varied since the time of David.

From a careful inspection of the registers of burials, in a certain number of country parishes in France, compared with the mortality of Paris, the following table has been made out, of the probable duration of human life

TABLE OF THE PROBABILITIES OF THE DURATION OF LIFE.

Age.	Duration of Life.		Age.	Duration of Life.		Age.	Duration of Life.	
Years	*Years.*	*Months.*	*Years.*	*Years.*	*Months.*	*Years.*	*Years.*	*Months.*
0	8	0	29	28	6	58	12	3
1	33	0	30	28	0	59	11	8
2	38	0	31	27	6	60	11	1
3	40	0	32	26	11	61	10	6
4	41	0	33	26	3	62	10	0
5	41	6	34	25	7	63	9	6
6	42	0	35	25	0	64	9	0
7	42	3	36	24	5	65	8	6
8	41	6	37	23	10	66	8	0
9	40	10	38	23	3	67	7	6
10	40	2	39	22	8	68	7	0
11	39	6	40	22	1	69	6	7
12	38	9	41	21	6	70	6	2
13	38	1	42	20	11	71	5	8
14	37	5	43	20	4	72	5	4
15	36	9	44	19	9	73	5	0
16	36	0	45	19	3	74	4	9
17	35	4	46	18	9	75	4	6
18	34	8	47	18	2	76	4	3
19	34	0	48	17	8	77	4	1
20	33	5	49	17	2	78	3	11
21	32	11	50	16	7	79	3	9
22	32	4	51	16	0	80	3	7
23	31	10	52	15	6	81	3	5
24	31	3	53	15	0	82	3	3
25	30	9	54	14	6	83	3	2
26	30	2	55	14	0	84	3	1
27	29	7	56	13	5	85	3	0
28	29	0	57	12	10			

By this Table it appears, that it is reasonably to be expected, or, in other words, that we may lay an even wager, that an infant newly born, will live eight years longer; that an infant of one year, will live thirty-three years longer; that an infant of two years, will live thirty-eight years longer; that a man of twenty, will live thirty-three years and five months longer; that a man of thirty, will live twenty-eight years longer; and so proportionally of every other age.

Ideas of external things are conveyed to the soul of man by means of the five Senses for *seeing*, *hearing*, *feeling*, *tasting*, and *smelling*. The organs through which the senses act are the nerves, which are small thread-like fibres, distributed all over the body, and all of them connected with the brain.

The eyes seem to be formed very early in the human embryo. In the chicken, also, of all the parts that are double, these are the soonest produced; and it is observed from the eggs of several sorts of birds, as well as from those of lizards, that the eyes are much larger and more early in their

expansion than any other parts of the two-fold growth. Though in viviparous animals, and particularly in man, they are, at first, by no means so large in proportion as in the oviparous classes, yet they obtain their due formation sooner than any other parts of the body. Thus it is also with the organ of hearing. The little bones that help to compose the internal parts of the ear, are entirely formed, before any of the other bones have acquired any part of their growth and solidity. Hence it is evident, that those parts of the body which are furnished with the greatest quantity of nerves, are those which appear the soonest, and which are the soonest brought to perfection.

Mr Cheselden having couched for a cataract a boy of thirteen years of age, who had been blind from his birth, and having thus communicated to him the sense of sight, was at great pains to mark the progress of his visual powers. This youth, though hitherto incapable of seeing, was not, however, absolutely and entirely blind. Like every other person whose vision is obstructed by a cataract, he could distinguish day from night, and even black from white, or either of them from the vivid color of scarlet. Of the form of bodies, however, he saw nothing; nor of colors themselves, unless the light was strong. At first, the operation was performed only upon one of his eyes; and when he saw for the first time, so far was he from forming the smallest conception of distances, that he supposed, (as he himself expressed it,) that every thing he saw touched his eyes, in the same manner as every thing he felt touched his skin. The objects that pleased him most were those of which the surfaces were plane, and the figures regular; though as yet he could in no degree judge of their different forms, or assign a reason why some were more agreeable to him than others. The ideas he had entertained of colors during his former dark state, were so imperfect, that when he saw them in reality, he could hardly be persuaded they were the same. When such objects were shown him as he had been formerly familiar with by the touch, he observed them with earnestness, in order to distinguish them a second time. As of these, however, he had too many to retain all at once, the greatest number were forgotten; and for one thing which he knew, after seeing it, there were a thousand things, according to his own declaration, of which he no longer possessed the smallest remembrance. He was very much surprised to find that those persons and those things which he had loved best, were not the most pleasing to the eye; nor could he help testifying his disappointment in finding his parents less handsome than he had conceived them to be. Before he could distinguish that a picture resembled a solid body, about two months elapsed. Till then, he only considered it as a surface, diversified by a variety of colors; but when he began to perceive that these shadings actually represented human beings, he also began to examine by the touch, whether they had not the usual qualities of such bodies; and great was his surprise to find smooth and even, what he had supposed a very unequal surface. He was

then shown a miniature portrait of his father, which was contained in his mother's watch-case; and though he readily perceived the resemblance, yet he expressed his amazement how so large a face could be comprised in so small a compass. To him it appeared as strange as that a pint vessel should contain a bushel. At first, he could bear but a very small quantity of light, and he saw every object much larger than life; but in proportion as he observed objects that were in reality large, so in proportion he conceived the others to be diminished. Beyond the limits of what he saw, he had no conception of any thing. He knew that the apartment he occupied was only a part of the house; and yet he could not imagine how the latter should appear larger than the former. Before the operation, he formed no great expectations of the pleasures he should receive from the new sense he was promised. That he might be enabled to read and write, was his grand object. He said, among other things, that he could enjoy no greater delight from walking in the garden, with this sense, than without it; because there he already walked at his ease, and was acquainted with all the walks. With great truth he also remarked, that his blindness gave him one advantage over the rest of mankind; an advantage which, indeed, he preserved for a long time after he had obtained the sense of seeing; namely, that of being able to walk in the night with confidence and security. No sooner, however, had he began to enjoy this new sense, than he was transported beyond measure; and he declared that every new object was a new source of delight to him; that his pleasure was so great, he had not language to express it. About a year after, he was carried to Epsom, where there is a very beautiful and a very extensive prospect; with this he seemed greatly charmed; and the landscape before him, he called a new method of seeing. He was couched in the other eye a year after the former, and of both operations the success was equally great. When he saw with both eyes, every object appeared to him twice as large as when he saw with but one eye, though he did not see double, or at least he showed no marks from which any such conclusion might be drawn.

There is now a living instance of Cheselden's blind man, of whom a curious account has just been published. This person, whose name is Caspar Hauser, was by some foul means kept confined in a cell, from infancy to the age of about seventeen, and never had seen any object but the walls of his cell and a few toys. When directed to look out of the window upon a wide and extensive prospect, in all the glory of summer, he drew back with visible horror, exclaiming, ugly! ugly! About two years afterwards, in 1831, he was shown the same prospect, and asked why he called it ugly when he formerly saw it. He replied, "what I then saw was indeed very ugly. For when I looked at the window, it always appeared to me as if a window shutter had been placed close to my eyes, upon which a wall painter had spattered the contents of his different brushes, filled with white, blue, green, yellow, and red paint, all mingled together. Single things,

as I now see things, I could not at that time recognize and distinguish from each other. This was shocking to look at; and besides, it made me feel anxious and uneasy; because it appeared to me, as if my window had been closed up with this party-colored shutter, in order to prevent me from looking out into the open air. That what I then saw, were fields, hills, and houses; that many things, which at that time appeared to me much larger, were, in fact, much smaller; while many other things that appeared smaller, were, in reality, larger than other things, is a fact, of which I was afterwards convinced, by the experience gained during my walks; at length I no longer saw any thing more of the shutter." He stated that in the beginning, he could not distinguish between what was really round or triangular, and what was only painted as round or triangular. The men and horses represented on paper, appeared to him precisely like those that were carved in wood, but that in the packing and unpacking of them, he had soon found the difference.

We judge of distance only by experience, otherwise, when experience does not set us right, the more distant an object is, the smaller it appears. When, from particular circumstances, we cannot form a just idea of distance, and when we cannot judge of objects but by the angle, or rather the image, which they form in our eyes, we are then necessarily deceived as to the size of such objects. Every man has experienced how liable we are, in travelling by night, to mistake a bush which is at hand, for a tree which is at a distance, or indeed a tree which is at a distance, for a bush which is at hand. In the same manner, if we do not distinguish objects by their form, and if thereby we cannot judge of distance, the same fallacy will still remain: in this case, a fly which is passing rapidly, close before our eyes, will appear to be a bird at a considerable distance; and a horse which may be in the middle of a plain, without motion, and in an attitude similar, for example, to that of a sheep, will appear no larger than a sheep, till we have once discovered that it is a horse.

Whenever, therefore, we find ourselves benighted in an unknown place, where no judgment is to be formed of distance, we are every moment liable to deceptions of vision; hence originate, in part, the dreadful anecdotes of SPECTRES, and of those strange, hideous, and gigantic figures, which so many persons tell us they have seen. Though such appearances, it is commonly asserted, exist solely in the imagination, yet it is highly possible that they might appear literally to the eye, and be in every respect seen as described to us.

The deception arising from the eye misjudging of magnitudes and distances, is not, however, the only source of spectral illusions. Disease, particularly of the head, and violent excitement of the nervous system, often produce the most singular and vivid phantasms. Of this kind, many cases are on record in the annals of medicine. One of the first that was brought to public notice, and one of the most remarkable, is that of M. Nicolai, the

celebrated German bookseller, and member of the Royal Society of Berlin. It is related by himself. Nicolai had for years been subject to a congestion in the head, to relieve which, he was frequently blooded by leeches.

"In the first two months of the year 1791, (says he,) I was much affected in my mind, by several incidents of a very disagreeable nature; and on the 24th of February, a circumstance occurred which irritated me extremely. At ten o'clock in the forenoon, my wife and another person came to console me; I was in a violent perturbation of mind, owing to a series of incidents which had altogether wounded my moral feelings, and from which I saw no possibility of relief, when suddenly I observed, at the distance of ten paces from me, a figure—the figure of a deceased person. I pointed at it, and asked my wife whether she did not see it. She saw nothing, but being much alarmed, endeavored to compose me, and sent for the physician. The figure remained some seven or eight minutes, and at length I became a little more calm; and, as I was extremely exhausted, I soon afterwards fell into a troubled kind of slumber, which lasted for half an hour. The vision was ascribed to the great agitation of mind in which I had been, and it was supposed I should have nothing more to apprehend from that cause; but the violent affection having put my nerves into some unnatural state, from this arose further consequences, which require a more detailed description.

"In the afternoon, a little after four o'clock, the figure which I had seen in the morning, again appeared. I was alone when this happened; a circumstance which, as may be easily conceived, could not be very agreeable. I went, therefore, to the apartment of my wife, to whom I related it. But thither, also, the figure pursued me. Sometimes it was present, sometimes it vanished; but it was always the same standing figure. A little after six o'clock, several stalking figures also appeared; but they had no connection with the standing figure. I can assign no other reason for this apparition than that, though much more composed in my mind, I had not been able so soon entirely to forget the cause of such deep and distressing vexation, and had reflected on the consequences of it, in order, if possible, to avoid them; and that this happened three hours after dinner, at the time when the digestion just begins.

"At length I became more composed, with respect to the disagreeable incident which had given rise to the first apparition; but though I had used very excellent medicines, and found myself in other respects perfectly well, yet the apparitions did not diminish, but, on the contrary, rather increased in number, and were transformed in the most extraordinary manner.

"After I had recovered from the first impression of terror, I never felt myself particularly agitated by these apparitions, as I considered them to be, what they really were, the extraordinary consequences of indisposition; on the contrary, I endeavored as much as possible to preserve my composure of mind, that I might remain distinctly conscious of what passed within me. I observed these phantoms with great accuracy, and very often

reflected on my previous thoughts, with a view to discover some law in the association of ideas, by which exactly these or other figures might present themselves to the imagination. Sometimes I thought I had made a discovery, especially in the latter period of my visions; but, on the whole, I could trace no connection which the various figures that thus appeared and disappeared to my sight had, either with my state of mind, or with my employment, and the other thoughts which engaged my attention. After frequent accurate observations on the subject, having fairly proved and maturely considered it, I could form no other conclusion on the cause and consequence of such apparitions, than that, when the nervous system is weak, and at the same time too much excited, or rather deranged, similar figures may appear, in such a manner as if they were actually seen and heard; for these visions, in my case, were not the consequence of any known law of reason, of the imagination, or of the otherwise usual association of ideas; and such also is the case with other men, as far as we can reason from the few examples we know.

"The origin of the individual pictures which present themselves to us, must undoubtedly be sought for in the structure of that organization by which we think; but this will always remain no less inexplicable to us, than the origin of those powers by which consciousness and fancy are made to exist.

"The figure of the deceased person never appeared to me after the first dreadful day; but several other figures showed themselves afterwards very distinctly; sometimes such as I knew; mostly, however, of persons I did not know; and amongst those known to me, were the semblances of both living and deceased persons, but mostly the former; and I made the observation, that acquaintances with whom I daily conversed never appeared to me as phantasms; it was always such as were at a distance.

"When these apparitions had continued some weeks, and I could regard them with the greatest composure, I afterwards endeavored, at my own pleasure, to call forth phantoms of several acquaintance, whom I for that reason represented to my imagination in the most lively manner, but in vain. For however accurately I pictured to my mind the figures of such persons, I never once could succeed in my desire of seeing them *externally*; though I had some short time before seen them as phantoms, and they had perhaps afterwards unexpectedly presented themselves to me in the same manner. The phantasms appeared to me in every case involuntarily, as if they had been presented externally, like the phenomena in nature, though they certainly had their origin internally; and, at the same time, I was always able to distinguish with the greatest precision phantasms from phenomena. Indeed, I never once erred in this, as I was in general perfectly calm and self-collected on the occasion. I knew extremely well, when it only appeared to me that the door was opened, and a phantom entered, and when the door really was opened, and any person came in.

"It is also to be noted, that these figures appeared to me at all times, under the most different circumstances, equally distinct and clear. Whether I was alone or in company, by broad daylight equally as in the night-time, in my own as well as in my neighbor's house; yet when I was at another person's house they were less frequent, and when I walked the public street they very seldom appeared. When I shut my eyes, sometimes the figures disappeared, sometimes they remained, even after I had closed my eyes. If they vanished in the former case, on opening my eyes again the same figures appeared which I had seen before.

"I sometimes conversed with my physician and my wife, concerning the phantasms which at the time hovered around me; for in general the forms appeared oftener in motion than at rest. They did not always continue present—they frequently left me altogether, and again appeared for a shorter or longer space of time, singly or more at once; but, in general, several appeared together. For the most part, I saw human figures of both sexes; they commonly passed to and fro as if they had no connection with each other, like people at a fair, where all is bustle; sometimes they appeared to have business with one another. Once or twice I saw amongst them persons on horseback, and dogs and birds; these figures all appeared to me in their natural size, as distinctly as if they had existed in real life, with the several tints on the uncovered parts of the body, and with all the different kinds of colors of clothes. But I think, however, that the colors were somewhat paler than they are in nature.

"None of the figures had any distinguishing characteristic; they were neither terrible, ludicrous, nor repulsive: most of them were ordinary appearances—some were even agreeable.

"On the whole, the longer I continued in this state, the more did the number of phantasms increase, and the apparitions become more frequent. About four weeks afterwards, I began to hear them speak: sometimes the phantasms spoke with one another, but for the most part they addressed themselves to me: those speeches were in general short, and never contained any thing disagreeable. Intelligent and respected friends often appeared to me, who endeavored to console me in my grief, which still left deep traces in my mind. This speaking I heard most frequently when I was alone; though I sometimes heard it in company, intermixed with the conversation of real persons; frequently in single phrases only, but sometimes even in connected discourse.

"Though at this time I enjoyed rather a good state of health, both in body and mind, and had become so very familiar with these phantasms, that at last they did not excite the least disagreeable emotion, but on the contrary afforded me frequent subjects for amusement and mirth; yet, as the disorder sensibly increased, and the figures appeared to me for whole days together, and even during the night, if I happened to awake, I had recourse to several medicines, and was at last again obliged to have recourse to the application of leeches.

"This was performed on the 20th of April, at eleven o'clock in the forenoon. I was alone with the surgeon, but during the operation the room swarmed with human forms of every description, which crowded fast one on another; this continued till half past four o'clock, exactly the time when the digestion commences. I then observed that the figures began to move more slowly; soon afterwards the colors became gradually paler, and every seven minutes they lost more and more of their intensity, without any alteration in the distinct figure of the apparitions. At about half past six o'clock, all the figures were entirely white, and moved very little; yet the forms appeared perfectly distinct; by degrees they became visibly less plain, without decreasing in number, as had often formerly been the case. The figures did not move off, neither did they vanish, which also had usually happened on other occasions. In this instance they dissolved immediately into air; of some, even whole pieces remained for a length of time, which also by degrees were lost to the eye. At about eight o'clock, there did not remain a vestige of any of them, and I never since experienced any appearance of the same kind. Twice or thrice since that time, I have felt a propensity, if I may be so allowed to express myself, of a sensation, as if I saw something which in a moment again was gone. I was even surprised by this sensation, whilst writing the present account, having, in order to render it more accurate, perused the papers of 1791, and recalled to my memory all the circumstances of that time. So little are we sometimes, even in the greatest composure of mind, masters of our imagination."

As the sense of sight is the effect of the action of light upon the eye, it is well known that too much light as well as too little, is extremely prejudicial. Travellers, who cross countries covered with snow, are obliged to wear a crape before their eyes. Persons, therefore, who read or write much, should accustom themselves to a moderate light.

There are many reasons to induce us to suppose, that such persons as are short-sighted, would see objects larger than others; and yet it is a certain truth that they see them smaller.

Error is however not confined to any one sense; and that of HEARING is liable to similar mistakes with that of sight. This sense conveys no distinct intelligence of the distance whence a sounding body is heard: a great noise far off, and a small one very near, produce the same sensation; and, unless we receive information from some other sense, we can never distinctly tell whether the sound be a great or a small one. It is not till we have, by experience, become acquainted with any particular sound, that we can judge of the distance when we hear it. When, for example, we know the tone of a bell, we are then at no great loss to determine how far it is from us.

The air is the principal means of conveying the sound.* Sound is in

* The strokes of a bell give no sound, when it is placed under the receiver of an air pump, which is exhausted of its air.

effect always a vibration, or wave-like motion, communicated by other bodies to the air, and to our senses, by the air striking on our auditory nerve.

Every body that strikes against another, produces a sound, which is simple in such bodies as are not elastic, but which is often repeated in such as are. If we strike a bell, for instance, a single blow produces a sound, which is repeated by the undulations of the sonorous body, and which is multiplied as often as it happens to undulate or vibrate. These undulations succeed each other so fast, that the ear supposes them one continued sound; whereas, in reality, they form many sounds. Sounding bodies are, therefore, of two kinds; those unelastic ones, which being struck return but a single sound; and those more elastic, returning a succession of sounds, which uniting together form a tone. This tone may be considered as a great number of sounds, all produced, one after the other, by the same body, as we find in a bell which continues to sound for some time after it is struck. A continuing tone may be also produced from a non-elastic body, by repeating the blow quick and often, as when we beat a drum, or when we draw a bow along the string of a fiddle.

To know the manner in which musical sounds become pleasing, it must be observed, that no one continuing tone, how loud or swelling so ever, can give us satisfaction; we must have a succession of them, and those in the most pleasing proportion. The nature of this proportion may be thus conceived. If we strike a body incapable of vibration with a double force, or, what amounts to the same thing, with a double mass of matter, it will produce a sound that will be doubly grave. Music has been said, by the ancients, to have been first suggested by the blows of different hammers on an anvil. Suppose then we strike an anvil with a hammer of one pound weight, and again with a hammer of two pounds, the two pound hammer will produce a sound twice as grave as the former. But if we strike with a two pound hammer, and then with a three pound, the latter will produce a sound one third more grave than the former. If we strike the anvil with a three pound hammer, and then with a four pound, it will likewise follow, that the latter will be a quarter part more grave than the former. Now, in comparing all those sounds, it is obvious that the difference between one and two is more easily perceived than between two and three, three and four, or any numbers succeeding in the same proportion. The succession of sounds will be, therefore, pleasing in proportion to the ease with which they may be distinguished. That sound which is double the former, or, in other words, the octave to the preceding tone, will among all others be the most pleasing harmony. The next to that, which is as two to three, or, in other words, the third, will be most agreeable. And thus, universally, those sounds whose differences may be most easily compared are the most agreeable.

Sound has, in common with light, the property of being extensively diffused. Like light, it also admits of reflection. The laws of this reflec-

tion, it is true, are less distinctly understood than those of light: all we know is, that sound is principally reflected by hard bodies, and that their being hollow also sometimes increases the reverberation. The internal cavity of the ear, which is fashioned out in the temporal bone, like a cavern cut into a rock, seems to be fitted for the purposes of echoing sound with the greatest precision.

One of the most common complaints in old age is deafness; which probably proceeds from the failure of the nerves, in the labyrinth of the ear. This disorder also proceeds sometimes from a stoppage by the wax, which art may easily remedy. In order to know whether the defect be an internal or an external one, let the deaf person put a repeating watch into his mouth, and if he hears it strike, he may be assured that his disorder proceeds from an external cause, and may be in some measure cured.

It often happens that people hear better with one ear than the other; and these, it is observed, have what musicians call a bad ear. Buffon made many trials on persons thus circumstanced; and he always found that their defect in judging properly of sounds, proceeded from the inequality of their ears, and their receiving, by both at the same time, unequal sensations. In like manner, as such persons hear false, they also, without knowing it, sing false. They also frequently deceive themselves with regard to the side whence the sound comes, generally supposing the noise to come on the part of the best ear.

Hearing is a much more necessary sense to a man than to animals. In these it is only a warning against danger, or an encouragement to mutual assistance. In man, it is the source of most of his pleasures; and without it the rest of his senses would be of little benefit. A man born deaf, must necessarily be dumb; and his whole sphere of knowledge must be bounded by sensual objects. We have a singular, and perhaps an unexampled instance of a young man, who, being born deaf, was restored, at the age of twenty-four, to perfect hearing. The account, which is given in the memoirs of the Academy of Sciences, 1703, page 18, is in substance as follows:

"A young man of the town of Chartres, between the age of twenty-three and twenty-four, the son of a tradesman, and deaf and dumb from his birth, began to speak all of a sudden, to the utter astonishment of the whole town. He gave them to understand that, about three or four months before, he had heard the sound of the bells, and was greatly surprised at this new and unknown sensation. After some time, a kind of water issued from his left ear and he then heard perfectly well with both. During these three months he was sedulously employed in listening, without saying a word, and accustoming himself to speak softly, so as not to be heard, the words pronounced by others. He labored hard also, in perfecting himself in the pronunciation, and in the ideas attached to every sound. At length, having supposed himself qualified to break silence, he declared that he could now speak, though

as yet but imperfectly. Soon after, some able divines questioned him concerning his ideas of his past state; and principally with respect to God, his soul, the moral beauty of virtue, and deformity of vice. The young man, however, had not directed his solitary speculations into that channel. He had gone to mass indeed with his parents, had learned to sign himself with the cross, to kneel down, and to assume all the grimaces of a man in the act of devotion. But he did all this without any manner of knowledge of the intention or the cause; he saw others do the like, and that was enough for him. He knew nothing even of death, nor did it ever enter into his mind. He led a life of pure animal instinct; and though entirely taken up with objects of sense, and such as were present, he did not seem to have made such reflections even upon these, as might reasonably have been expected. The young man was not, however, deficient in understanding; but the understanding of a man, deprived of all commerce with others, is so very confined, that the mind is in some measure totally under the control of its immediate sensations."

It is highly possible, nevertheless, to communicate ideas to deaf men, which they previously wanted, and even to give them very precise notions of abstract and general subjects, by means of signs and of letters. A person born deaf, may, by time and application, be taught to read, to write, and even, by the motions of the lips, to understand what is said to him; a plain proof how much the senses resemble, and may supply the defects of each other. It is probable, however, that, as most of the motions of speech are made within the mouth by the tongue, the knowledge from the motion of the lips can be but very confined.

The sense of FEELING is spread over the whole body, but it employs itself differently in different parts. The sensation which results from feeling, cannot be excited otherwise than by the contact and immediate application of the superficies of some foreign body to that of our own. If we apply a foreign body against the breast, or upon the shoulder of a man, he will feel it; that is, he will know that there is a foreign body which touches him: but he will not have a single idea of the form of this body, because the breast touching the body in a single plane or surface, he cannot gather from it any knowledge of this body. It is the same with respect to all other parts of the body, which cannot adjust themselves upon the surface of foreign bodies, and bend themselves to embrace, at one time, many parts of their superficies. These parts of our body cannot, therefore, give any just idea of their form; but those which, like the hand, are divided into many small, flexible, and moveable parts, and which, consequently, can apply themselves, at one and the same time, upon the different planes of the superficies of the body, are those, which, in effect, give us the ideas of their form and of their size.

It is not, therefore, only because there is a greater quantity of nervous tufts, at the extremity of the fingers than in any other part of the body—it is not, as it is vulgarly pretended, because the hand has the most delicate

sense—that it is in effect the principal organ of feeling; on the contrary, we can say, that there are parts more sensible, and where the sense of feeling is more delicate, as the eyes, the tongue, &c.; but it is merely because the hand is divided into many parts, all moveable, all flexible, all acting at one and the same time, and all obedient to the will; it is because the hand is the only organ which gives us distinct ideas of the form of bodies. Animals which have hands, appear to be the most acute: apes do things so resembling the mechanical actions of man, that it seems as if they had the same succession of corporeal sensation for the cause of them. Animals which are deprived of this organ, cannot have any knowledge distinct enough of the form of things; as they cannot grasp any object, and as they have not any part divided and flexible enough to be able to adjust itself upon the superficies of bodies, they certainly have not any precise notion of the form, any more than of the size of them. It is for this reason that we often see them in suspense, or frightened, at the aspect of objects with which they ought to be the best acquainted, and which are the most familiar to them. The principal organ of their feeling is the muzzle, because this part is divided in two by the mouth, and because the tongue is another part, that serves them at the same time to touch bodies, which we see them turn and turn again, before they take them between their teeth.

It is, therefore, to the sense of feeling, that we are indebted for the power of usefully exercising all our other faculties. One man does not, perhaps, possess more ingenuity or capacity than another; but because in his earliest infancy he made a greater and a readier use of this sense. As soon as children are indulged with the liberty of their hands, they presently bring them into action, and are fond of touching whatever is presented to them. They are seen to amuse themselves, and take pleasure in handling every thing they are capable of grasping: they seem as if they were endeavoring to find out the form of bodies, by touching them on every side; and, for a considerable time, they amuse themselves in this manner, or rather they inform themselves of new objects. In the rest of our life, we ourselves, if we reflect upon it, amuse ourselves in a different method, in doing, or in seeking to do, any thing that is new.

Of the senses of SMELLING and TASTING, there is little to be said worthy of observation. It is evident, that, with respect to the first of these, there are animals which are infinitely superior to man; and perhaps there may exist creatures which, in delicacy of taste, may as much surpass the voluptuary, as the beagle does in acuteness of scent.

Of the numerous varieties of the human race, Cuvier mentions three only as eminently distinct, viz: the white, or *Caucasian;* the yellow, or *Mongolian;* and the negro, or *Ethiopian.* Blumenbach conceives they may be divided into five distinct varieties, viz: the Caucasian, Mongolian, Ethiopian, American, and Malayan; and other writers have farther subdivided these as their family characteristics were more or less marked.

1. The *Caucasian variety* includes all Europeans, with the exception of the Laplanders, and the inhabitants of the western and northern parts of Asia. They have the face oval; facial angle eighty-five degrees; forehead high, and expanding cheeks, colored red: hair long, brown, but varying from white to black.

2. The *Mongolian variety* inhabits eastern Asia, Finland, and Lapland, in Europe; and includes the Esquimaux of North America. They have a broad and flat olive colored face, with lateral projections of the cheek bones; facial angle seventy-five degrees; oblique and narrow eyes; hair hard, straight, black; beard thin.

3. The *Ethiopian variety*, inhabiting the middle parts of Africa, are black in a greater or less degree, with black woolly hair, jaws projecting forward, thick lips, and flat nose; facial angle seventy degrees.

4. The *American variety*, comprising all the aboriginal Americans, except the Esquimaux, are mostly tan or reddish copper-colored, with prominent cheek bones, short forehead, flattish nose, straight, coarse hair, and thin beard.

5. The *Malayan variety* includes the inhabitants of the islands in the Indian Ocean, and Polynesia. They are of a brown color, from a clear mahogany, to the darkest clove or chesnut brown, with thick, black, bushy hair, a broad nose, and wide mouth.

In considering the peculiarities which distinguish man from the brute creation, his capability of inhabiting every climate, and sustaining every degree of heat and cold, deserves to be noticed. While the geographical range of most animals is extremely limited, the physical and intellectual powers of man enable him to create a climate of his own in every degree of latitude: and while the Indian of Canada may sleep upon the snow with impunity with the thermometer at forty degrees below zero, the natives of Sierra Leone suffer, unhurt, the heat of a vertical sun, with the thermometer above one hundred degrees. And as the physical powers and intellectual resources of man enable him to occupy the whole surface of the globe, his capacity of living on every species of food renders him, in the widest sense of the word, omnivorous. The continued use of animal food is as natural and wholesome to the inhabitants of the Arctic regions, where it is impossible to raise vegetables, as a mixed diet is to the Englishman; and vegetable food within the tropics is necessary from the exuberance of this part of the creation, and the comparative scarcity of those gregarious animals on which man subsists in other latitudes.

There are many causes which contribute to the producing of an apparent variety, between the different nations of the globe. Climate, food, manners, and customs, produce not only a difference in sentiment, but even in the external form of a different people.

In examining the surface of the earth, and beginning our inquiries from the north, we find in Lapland, and in the northern parts of Tartary, a race

of small-sized men, whose figure is uncouth, and whose physiognomy is as wild as their manners are unpolished. Though they seem to be of a degenerate species, they yet are numerous, and the countries they occupy are extensive.

The Laplanders, the Danes, the Swedes, the Muscovites, the inhabitants of Nova Zembla, the Samoyedes, the Ostiacs of the old continent, the Greenlanders, and the savages to the north of the Esquimaux Indians of the new continent, appear to be of one common race, which has been extended and multiplied along the coasts of the northern seas, and over deserts considered as uninhabitable by every other nation. In these countries, the visage is large and broad, the nose is flat and short, the eyes are of a yellowish brown inclining to black, the eyelids are drawn towards the temples, the cheek bones are extremely prominent, the mouth is very large, the lower part of the countenance is very narrow, the lips are thick and turned outward, the voice is shrill, the head is bulky, the hair is black and straight, and the skin is tawny. The Laplanders are small in stature, and, though meagre, they are yet of a squat form. In general, their size is about four feet, nor do the tallest exceed four feet and a half; and among these people, if there is any difference to be found, it depends on the greater or less degree of deformity.

In winter the Laplanders clothe themselves with the skin of the rein-deer, and in summer with the skins of birds. To the use of linen they are utter strangers. The women of Nova Zembla have their nose and their ears pierced, in order to have them ornamented with pendants of blue stone; and, as an additional lustre to their charms, they also form blue streaks upon their forehead and chin. Those of Greenland dress themselves with the skin of the dog-fish: they also paint the visage with blue and yellow colors, and wear pendants in the ears. They all live under ground, or in huts almost entirely covered with earth, and with the bark of certain trees, or the skins of certain fishes; and some form subterranean trenches, by which one hut communicates with another, and by which, during the winter months, they enjoy the conversation and society of their neighbors. A continued darkness for several months, obliges them to illuminate their dreary abode with lamps, which they keep alive with that very train oil they use as drink. Under all these hardships they are subject to few diseases, and live to a prodigious age. So vigorous indeed are the old men, that they are hardly to be distinguished from the young. The only infirmity they experience, and it is an infirmity common to them all, is that of blindness. Dazzled as they perpetually are, by the strong reflection of the snow in winter, and enveloped in clouds of smoke in autumn and spring, rarely, when advanced in years, are they still found to retain the use of their eyes.

The Tartar country, taken in general, comprehends the greatest part of Asia, and in fact extends from Russia to Kamtschatka. All the Tartar nations have the upper part of the visage very large and wrinkled, even

while yet in their youth. Their nose is short and flat, their eyes are little, and sunk in the head; their cheek bones are high; the lower part of their visage is narrow; their chin is long and prominent; their teeth are long and straggling; their eyebrows are so large as to cover the eyes; their eyelids are thick; their face is broad and flat; their complexion is tawny; and their hair is black. They have but little beard, have thick thighs, and short legs, and, though but of middling stature, they yet are remarkably strong and robust. The ugliest of them are the Calmucks, in whose appearance there seems to be something frightful. They are all wanderers; and their only shelter is that of a tent made of hair or skins. Their food is horse-flesh and camel-flesh, either raw, or a little sodden between the horse and the saddle. They eat also fish dried in the sun. Their most common drink is mare's milk, fermented with millet ground into meal. They all have the head shaved, except a tuft of hair on the top, which they let grow sufficiently long to form into tresses on each side of the face. The women, who are as deformed as the men, wear their hair, which they bind up with bits of copper, and other ornaments of the same nature.

Some travellers tell us, that the limbs of the CHINESE are well proportioned, that their body is large and fat, their visage large and round, their eyes small, their eyebrows large, their eyelids turned upwards, their nose short and flat; that, as for their beard, which is black, upon the chin there is very little, and upon each lip there are not more than seven or eight prickles: that those who inhabit the southern provinces of the empire are more brown and tawny than the others; that, in color, they resemble the natives of Mauritania, and the more swarthy Spaniards; but that those who inhabit the middle provinces are as fair as the Germans.

Le Gentel assures us, that the Chinese women do every thing in their power to make their eyes appear little, and oblong; that, for this purpose, it is a constant practice with the little girls, from the instruction of the mother, forcibly to extend their eyelids; and that, with the addition of a nose thoroughly compressed and flattened, of ears long, large, open, and pendant, they are accounted complete beauties. He adds, that their complexion is delicate, their lips are of a fine vermilion, their mouth is well proportioned, their hair is very black; but that, by the use of paint, they so greatly injure their skin, that before the age of thirty they have all the appearance of old age.

So strongly do the JAPANESE resemble the Chinese, that we can hardly scruple to rank them in the same class. They only differ from them in being more yellow, or more brown. In general, their stature is contracted, their face as well as their nose is broad and flat, their hair is black, and their beard is little more than perceptible. They are haughty, fond of war, full of dexterity and vigor, civil and obliging, smooth-tongued, and courteous, but fickle and vain. With astonishing patience, and even almost regardless of them, they sustain hunger, thirst, cold, heat, fatigue, and all

other hardships of life. Their ceremonies, or rather their grimaces, in eating, are numerous and uncouth. They are laborious, are very skilful artificers, and, in a word, have nearly the same disposition, the same manners, and the same customs as the Chinese.

One custom which they have in common, and which is not a little fantastic, is, so to contract the feet of the women, that they are hardly able to support themselves. Some travellers mention, that in China, when a girl has passed her third year, they break the foot in such a manner, that the toes are made to come under the sole; that they apply to it a strong water, which burns away the flesh; and, that they wrap it up in a number of bandages, till it has assumed a certain fold. They add, that the women feel the pain of this operation all their lives; that they walk with great difficulty; and that their gait is to the last degree ungraceful. Other travellers do not say that they break the foot in their infancy, but that they only compress it with so much violence as to prevent its growth; but they unanimously allow, that every woman of condition, and even every handsome woman, must have a foot small enough to enter, with ease, the slipper of a child of six years old.

The Moguls, (Hindoos,) and the other inhabitants of the peninsula of India, are not unlike the Europeans, in shape and in features; but they differ more or less from them in color. The Moguls are of an olive complexion; and yet, in the Indian language, the word *Mogul* signifies *White*. The women are extremely delicate, and they bathe themselves very often: they are of an olive color, as well as the men; and, contrary to what is seen among the women of Europe, their legs and thighs are long, and their body is short.

The inhabitants of Persia, of Turkey, of Arabia, of Egypt, and of the whole of Barbary, may be considered as one and the same people, who, in the time of Mahomet, and of his successors, invaded immense territories, extended their dominions, and became exceedingly intermixed with the original natives of all those countries. The Persians, the Turks, and the Moors, are to a certain degree civilized; but the Arabians have, for the most part, remained in a state of independence, which implies a contempt of laws.

The Egyptian women are very brown; their eyes are lively; their stature is rather low; their mode of dress is by no means agreeable; and their conversation is extremely tiresome. But though the women of Egypt are commonly rather short, yet the men are of a good height. Both, generally speaking, are of an olive color; and the more we remove from Cairo, the more we find the people tawny, till we come to the confines of Nubia, where they are as black as the Nubians themselves.

"The women of Circassia," says Struys, "are exceedingly fair and beautiful. Their complexion is incomparably fine; their forehead is large and smooth; and, without the aid of art, their eyebrows are so delicate, that

they appear as threads of silk. Their eyes are large, soft, and yet full of animation; their mouth is small and expressive of a smile, and their chin what it ought to be, in order to form a perfect oval. Their neck and breasts are admirably formed; their stature is tall, and the shape of their body easy; their skin is white as snow, and their hair of the most beautiful black."

The TURKS, who purchase a vast number of those women as slaves, are a people composed of many different nations. From the intermixture, during the crusades, of the Armenians, the Georgians, and the Turcomans, with the Arabians, the Egyptians, and even the Europeans, it is hardly possible to distinguish the native inhabitants of Asia Minor, of Syria, and of the rest of Turkey. All we can observe is, that the Turkish men are generally robust, and tolerably well made; that it is even rare to find among them persons either hump-backed or lame; that the women are also beautiful, well proportioned, and free from blemishes; that they are very fair, because they seldom stir from home; and that, when they do go abroad, they are always veiled.

Before the Czar Peter I., we are told, the MUSCOVITES had not merged from barbarism. Born in slavery, they were ignorant, brutal, cruel, without courage, and without manners. Men and women bathed promiscuously in bagnios, heated to a degree intolerable to all persons but themselves; and on quitting this warm bath, they plunged, like the Laplanders, into cold water. They are now a people in some degree civilized, and commercial, fond of spectacles, and of other ingenious novelties.

From the regions of Europe and Asia, our attention is now to be directed to a race of people differing more from ourselves in external appearances, than any that has been hitherto mentioned.

In the seventeenth or eighteenth degree of north latitude, on the African coast, we find the NEGROES of Senegal and of Nubia, some in the neighborhood of the ocean, and others of the Red Sea; and after them, all the other nations of Africa, from the latitude of eighteen north, to that of eighteen south, are black, the Ethiopians, or Abyssinians excepted. It appears, then, that the portion of the globe which nature has allotted to this race of men, contains an extent of ground, parallel to the equator, of about nine hundred leagues in breadth, and considerably more in length, especially northward of the equator. Beyond the latitude of eighteen or twenty, there are no longer any negroes, as will appear when we come to speak of the Caffres and of the Hottentots.

By confounding them with their neighbors the Nubians, we have been long in an error, with respect to the color and the features of the ETHIOPIANS. Marmol says, that the Ethiopians, (Abyssinians,) are absolutely black, that their visage is large, and their nose flat; and in this description the Dutch travellers agree with him. The truth, however, is, that they differ from the Nubians, both in color and in features. The skin of the Ethiopians is brown, or olive colored, like that of the southern Arabians, from whom, it

is probable, they derive their origin. In stature they are tall; the features of their countenance are strongly marked; their eyes are large and beautiful; their nose is well proportioned; their lips are thin; and their teeth are white. Of the inhabitants of Nubia, on the contrary, the nose is flat, the lips are thick and prominent, and the countenance is exceedingly black. These Nubians, as well as the Barbarians, their western neighbors, are a species of negroes, not unlike those of Senegal.

The first negroes we meet with, are those who live on the south side of Senegal. These people, as well as those who occupy the different territories between Senegal and Gambia, are called *Jalofes*. They are all very black, well proportioned, and of a size sufficiently tall. Their features are less harsh than those of the other negroes; and some of them there are, especially among the female sex, whose features are far from irregular. Among them, to be perfectly beautiful the color must be exceedingly black, and exceedingly glossy: their skin, however, is highly delicate and soft; and color alone excepted, we find among them women as handsome as in any other country in the world. They are usually very gay, lively, and amorous.

Father du Tertre says expressly, that, if the negroes are for the most part flat-nosed, it is because the parents crush the noses of their children; that in the same manner they compress their lips, in order to render them thicker; and that of the few who have undergone neither of these operations, the features of the countenance are as comely, the nose is as prominent, and the lips are as delicate as those of the Europeans. It appears, however, that among the negroes in general, thick lips and a nose broad and flat, are gifts from nature, by which was originally introduced, and at length established, their custom of flattening the nose and thickening the lips of such as at their birth discovered a deficiency in these ornaments. Though the negroes of Guinea are in general very healthy, yet they seldom attain what we term old age.

The negroes in general are a remarkably innocent and inoffensive people. If properly fed, and unexposed to bad usage, they are contented, joyous and obliging; and on their very countenances may we read the satisfaction of their souls. If hardly dealt with, on the other hand, their spirits forsake them, and they droop with sorrow.

Mr Kolben, though he has given so minute a description of the Hottentots, is strongly of opinion, however, that they are negroes. Like that of the latter, he assures us, that their hair is short, black, frizzled, and woolly; nor in a single instance did he ever observe it long.

Though of all the Hottentots, the nose is very flat, and very broad, yet it would not be of that form, did not their mothers, considering a prominent nose as a deformity, think it a duty incumbent upon them to crush it presently after their birth. Their lips are also thick, and their upper lip is particularly so; their teeth are very white; their evebrows are thick; their

head is large; their body is meagre; their limbs are slender. They seldom live longer than forty years; and of this short duration of life, the causes doubtless are, their being so fond of filth, and residing continually in the midst of it; as also their living upon meat which is tainted or corrupted, of which indeed their nourishment chiefly consists. We might dwell longer upon the description of this nasty people; but as most travellers have given very large accounts of them, to their writings we refer. One fact, however, related by Tavernier, we ought not to pass in silence. The Dutch, he says, once took a Hottentot girl, soon after her birth; and after bringing her up among themselves, she became as white as an European. From this circumstance he presumes, that all the Hottentots would be of a tolerable whiteness, were it not for their custom of perpetually begriming themselves.

Though in AMERICA, we observe less variety in the human form than might be expected in so extremely extensive a continent, it cannot yet be supposed, but that, in such a diversity of climates and situations, a considerable diversity of inhabitants must also be found.

In beginning our inquiries, then, we find in the most northern parts of America, a species of Laplanders, similar to those of Europe, or to the Samoyedes of Asia; and though, in comparison to the latter, they are few in number, yet they are diffused over a considerable extent of ground. Those who inhabit the land of Davis' Strait are of a diminutive size, of an olive complexion, and their legs are short and thick. They are skilful fishers; they eat their fish and their meat raw; their drink consists of pure water, or of the blood of the dog-fish; they are, moreover, very strong, and generally live to a great age. Here we see the figure, the color, and the manners of the Laplanders; and, what is truly singular is, that, as among the Laplanders of Europe, we meet with the Finlanders, who are white, comely, tall, and tolerably well made; so, in like manner, among the Laplanders of America, we meet with another species of men, tall, well made, tolerably white, and with features exceedingly regular.

Of a different race from the former, seem to be the savages of Hudson's Bay, and northward of the land of Labrador: they are, however, ugly, diminutive, and unshapely; their visage is almost entirely covered with hair, like the savages of the country of Yesso, northward of Japan. In summer they dwell under tents made of skins of the rein-deer; in winter they live under ground, like the Laplanders and the Samoyedes, and, like them, sleep together promiscuously, and without the smallest distinction. They likewise live to a great age, though they feed on nothing but raw meat and fish. The savages of Newfoundland have a considerable resemblance to those of Davis' Strait; they are low in stature; they have little or no beard; their visage is broad and flat; their eyes are large; they are generally rather flat-nosed; and, upon the whole, are far from being unlike the savages of the northern continent, and of the environs of Greenland.

Besides these savages, who are scattered over the most northern parts of America, we find others more numerous, and altogether different, in Canada, and in the vast extent of land to the Arctic sea. These are all tolerably tall, robust, vigorous, and well made; they have hair and eyes black, teeth very white, a complexion tawny, their beard scanty, and over the whole of their body hardly a vestige of hair; they are hardy, indefatigable walkers, and very nimble runners. They are alike unaffected by excesses of hunger, and of repletion; they are by nature bold and fierce, grave and sedate. So strongly, indeed, do they resemble the Oriental Tartars in the color of the skin, the hair, and the eyes, in the scantiness of beard, and of hair, as also in disposition and in manners, that, were they not separated from each other by an immense sea, we should conclude them to be descended from that nation. In point of latitude, their situation is also the same; and this still farther proves how powerfully the climate influences not only the color, but the figure of men.

If, however, in the whole of North America, there were none but savages to be met with, in Mexico, and in Peru, there were found nations polished, subjected to laws, governed by kings, industrious, acquainted with the arts, and not destitute of religion.

In the present state of these countries, so intermixed are the inhabitants of Mexico and New Spain, that hardly do we meet with two visages of the same color. In the city of Mexico, there are white men from Europe, Indians from the north, and from the south of America, and negroes from Africa, &c., insomuch, that the color of the people exhibits every different shade which can subsist between black and white. The real natives of the country are of a very brown olive color, well made and active; and though they have little hair, even upon their eyebrows, yet upon their head their hair is long and very black.

In surveying the different appearances which the human form assumes in the different regions of the earth, the most striking circumstance is that of color. This circumstance has been attributed to various causes; but experience justifies us in affirming, that of this the principal cause is the heat of the climate. When this heat is excessive, as at Senegal and in Guinea, the inhabitants are entirely black; when it is rather less violent, as on the eastern coasts of Africa, they are of a lighter shade; when it begins to be somewhat more temperate, as in Barbary, in India, in Arabia, &c., they are only brown; and, in fine, when it is altogether temperate, as in Europe, and in Asia, they are white; and the varieties which are there remarked, proceed solely from varieties in the mode of living. All the Tartars, for example, are tawny, while the Europeans, who live in the same latitude, are white. Of this difference the reasons seem to be, that the former are always exposed to the air; that they have no towns, no fixed habitations; that they sleep upon the earth, and in every respect live coarsely and savagely. These circumstances alone, are sufficient to rende

them less white than the Europeans, to whom nothing is wanting which may render life comfortable and agreeable. Why are the Chinese whiter than the Tartars, whom they resemble in all their features? It is because they live in towns, because they are civilized, because they are provided with every expedient for defending themselves from the injuries of the weather, to which the Tartars are perpetually exposed.

When cold becomes extreme, however, it produces some effects similar to those of excessive heat. The Samoyedes, the Laplanders, the Greenlanders, are very tawny; and it is even asserted, as we have already observed, that, among the Greenlanders, there are men as black as those of Africa. Here we see two extremes meet: violent cold and violent heat produce the same effect upon the skin, because these two causes act by one quality, which they possess in common. Dryness is this quality; and it is a quality of which intense cold is equally productive as intense heat; so by the former, as well as by the latter, the skin may be dried up, altered, and rendered as tawny as we find it among the Laplanders. Cold compresses, shrivels, and reduces within a narrow compass, all the productions of nature; and thus it is, that we find the Laplanders, who are perpetually exposed to all the rigors of the most piercing cold, the most diminutive of the human species.

The most temperate climate is between the degrees of forty and fifty. There we behold the human form in its greatest perfection; and there we ought to form our ideas of the real and natural color of man. Situated under this zone, the civilized countries are, Georgia, Circassia, the Ukraine, European Turkey, Hungary, South Germany, Italy, Switzerland, France, the north of Spain, and the northern part of the United States of America; of all which the inhabitants are the most beautiful, and the most shapely, in the world.

As the first, and almost the sole cause of the color of mankind, we ought therefore to consider the climate; and though upon the skin the effects of nourishment are trifling, when compared with those of the air and soil, yet upon the form they are prodigious. Food which is gross, unwholesome, or badly prepared, has a strong and a natural tendency to produce a degeneracy in the human species; and in all countries where the people fare wretchedly, they also look wretchedly, and are uglier and more deformed than their neighbors. Even among ourselves, the inhabitants of country places are less handsome than the inhabitants of towns; and we have often remarked, that in one village, where poverty and distress were less prevalent than in another village of the vicinity, the people of the former were, at the same time, in person more shapely, and in visage less deformed.

The air and the soil have also great influence, not only on the form of men, but on that of animals, and of vegetables. Let us, after examining the peasants who live on hilly grounds, and those who live embosomed in the neighboring valleys, compare them together, and we shall find that the

former are active, nimble, well shaped, and lively; the women commonly handsome; that, on the contrary, in the latter, in proportion as the air, food, and water are gross, the inhabitants are clumsy, and less active and vigorous.

From every circumstance, therefore, we may obtain a proof, that mankind are not composed of species essentially different from each other; that, on the contrary, there was originally but one individual species of men, which, after being multiplied and diffused over the whole surface of the earth, underwent divers changes, from the influence of the climate, from the difference of food, and of the mode of living, from epidemical distempers, as also from the intermixture, varied *ad infinitum*, of individuals more or less resembling each other.

Of ACCIDENTAL VARIETIES IN THE HUMAN SPECIES. Besides those great varieties proceeding from general causes, which have just been noticed, says Buffon, and which serve as marks of distinction to the nations of the earth, there are others, which affect only individuals, which appear casual and often unfortunate deviations from the general standard. The *Blafards*, or WHITE NEGROES, (if this expression may be admitted,) are among the first of these extraordinary deviations which attract our attention. They are found occasionally in all parts of the East Indies, at Madagascar, in Africa, at Carthagena, and most parts of South America. They are a weak, imbecile class of human beings, and are in general barren. The negresses at Carthagena and Panama, more frequently than any others, are known to produce Blafards; and it is to be observed, that the climate there is more debilitating to the human frame. "Those of Darien," says a modern traveller, "have so marked a resemblance to the white negroes of Africa, that we cannot but assign them the same origin. Their color is dead white, like that of paper or muslin, and without the least appearance of red on any part of the surface of the body. They are born white, and their skin never darkens. In Africa their hair is white and woolly, like that of the genuine negroes; and in Asia it is long, and as white as snow, or reddish inclining to yellow. Their eyebrows and eyelashes resemble the skin of the eider-duck, or rather the soft down which is about the throat of a swan. The iris is sometimes of a pale blue, and sometimes of a lively yellow inclining to reddish. They are in general remarkably feeble and low of stature." A white negress, of the name of Genevieve, was born of black parents in the island of Dominica, in the year 1759. Her father and mother were brought from the Gold Coast in Africa, and were perfectly black. Genevieve was white in every part of her body. She was about four feet eleven inches high, and her body was well proportioned. Every feature was completely correspondent to those of the negroes. The lips and the mouth, however, though perfectly formed like those of other negroes, had a singular appearance for want of color; they were as white as the rest of her skin, with no appearance of red. Her skin in general was of a tallow color; when she

approached the fire, however, there was a slight tinge of red appeared in her cheeks. Her head was well covered with wool of about an inch and a half in length. It was harsh, thick, and frizzled; it was white at the roots, and reddish at the extremity. The eyebrows were just marked by a light white down, and the eyelashes were rather more apparent. Her eyes appeared of a dull blue. This white negress endured the full light of the sun without winking, or any apparent inconvenience. She was, what is called, short-sighted: but she could distinguish the smallest objects at two or three inches from her eyes. But the most singular circumstance respecting her eyes, was a continual motion, or oscillation, by which they alternately turned from and towards each other; and this motion she was not able to stop.

Her teeth were well arranged, and finely enamelled; there was no disagreeable smell about her, nor any oiliness upon the skin, as is often the case with common negroes. Her hands were large but well formed, and were covered with wrinkles, like those of an old person. Her feet and her ancles were also wrinkled. Her parents produced only this girl white; the rest of their children were all perfect negroes.

It has been said that these white negroes, if united with blacks, would produce a pied race; but however this be, it is certain that pied or spotted negroes are not uncommon. It arises evidently from some defective organization in the skin; and we have instances even in this climate of a similar deviation from the ordinary course of nature.

The Albinoes are, among the whites, that which the *Blafards*, as Buffon denominates them, are among the blacks. This name was originally given by the Portuguese to Moors who were born white, and has since been appropriated to similar individuals in our own race. The best accoun which has yet appeared of Albinoes is the following, which was sent by Dr Traill, of Liverpool, to Nicholson's Journal.

"Robert Edmond and his wife Anne are both natives of Anglesey, in North Wales. He has blue eyes, and hair almost black; her eyes are blue, and her hair of a light brown. Neither of them have remarkably fair skins. They have been married fourteen years. Their first child, a girl, had blue eyes and brown hair. The second, a boy, (now before me,) has the characteristics of an Albino; viz: very fair skin, flaxen hair, and rose-colored eyes. The third and fourth children were twins, and both boys; one of them has blue eyes and dark brown hair; the other was an Albino. The former is still alive: the Albino lived nine months, though a very puny child. The fifth child, a girl, had blue eyes and brown hair. The sixth, and last now here, is a perfect Albino.

"The oldest of these Albinoes is now nine years of age, of a delicate constitution, slender, but well formed both in person and in features; his appetite has always been bad; he frequently complains of a dull pain in his forehead; his skin is exceedingly fair; his hair flaxen and soft; his cheeks

have very little of the rose in them. The iris and pupil of his eyes are of a bright rose-red color, reflecting in some situations an opaline tinge. He cannot endure the strong light of the sun. When desired to look up, his eyelids are in constant motion, and he is incapable of fixing the eye steadily on any object, as is observed in those laboring under some kind of slight ophthalmia, but in him is unaccompanied by tears. His mother says, that his tears never flow in the coldest weather; but when vexed they are shed abundantly. The white of the eye is generally bloodshot. He says he sees better by candle than by daylight; especially at present, when the reflection from the snow on the ground is extremely offensive to him. He goes to school, but generally retires to the darkest part of it to read his lesson, because this is most agreeable to his eyes. In my room, which has a northern aspect, he can only distinguish some of the letters in the pages of the Edinburgh Review; but, if the light is not permitted to fall full on the book, he is able to read most of them. He holds the book very near his eye. His disposition is very gentle; he is not deficient in intellect."

Among the sports of nature, with respect to the human race, not one of the least singular was the PORCUPINE MAN. He was born in the county of Suffolk, England, in 1710. The skin of his body was covered with excrescences like thorns, or prickles, and about the thickness of a packthread. His face, the palms of his hands, and the soles of his feet, were the only parts which were free from these singular warts. They were of a reddish brown, and had such a degree of hardness and elasticity, as to rattle when the hand was moved over the body. They were half an inch long in some parts, and were shorter in others. They did not appear till two months after his birth; but, what is most extraordinary, they dropped off every winter, and were renewed in the spring. In other respects the man enjoyed a good state of health. He had six children, all of whom, like their father, were covered with these excrescences.

Among these varieties of nature in the human species, we may reckon dwarfs and giants. Deceived by some optical illusion, the ancient historians gravely mention whole nations of pigmies, as existing in remote quarters of the world. The more accurate observations of the moderns, however, convince us that these accounts are entirely fabulous.

The existence, therefore, of a pigmy race of mankind, being founded in error or in fable, we can expect to find men of diminutive stature only by accident, among men of the ordinary size. Of these accidental dwarfs, every country, and almost every village, can produce numerous instances: there was a time when these unfavored children of nature were the peculiar favorites of the great; and no prince, or nobleman, thought himself completely attended, unless he had a dwarf among the number of his domestics. These poor little men were kept to be laughed at, or to raise the barbarous pleasure of their masters, by their contrasted inferiority. Even in England, as late as the time of King James the First, the court was at one time

furnished with a dwarf, a giant, and a jester. These, the king often took a pleasure in opposing to each other, and often fomented quarrels among them, in order to be a concealed spectator of their animosity.

It was in the same spirit that Peter of Russia, in the year 1710, celebrated a marriage of dwarfs. This monarch, though raised by his native genius far above a barbarian, was, nevertheless, still many degrees removed from actual refinement. His pleasures, therefore, were of the vulgar kind; and this was among the number. Upon a certain day, which he had ordered to be proclaimed several months before, he invited the whole body of his courtiers, and all the foreign ambassadors, to be present at the marriage of a pigmy man and woman. The preparations for this wedding were not only very grand, but executed in a style of barbarous ridicule. He ordered, that all the dwarf men and women, within two hundred miles, should repair to the capital; and also insisted, that they should be present at the ceremony. For this purpose, he supplied them with proper vehicles; but so contrived it, that one horse was seen carrying a dozen of them into the city at once, while the mob followed shouting and laughing from behind. Some of them were at first unwilling to obey an order, which they knew was calculated to turn them into ridicule, and did not come; but he soon obliged them to obey; and, as a punishment, enjoined that they should wait upon the rest at dinner. The whole company of dwarfs amounted to seventy, beside the bride and bridegroom, who were richly adorned, and in the extremity of the fashion. For this company in miniature, every thing was suitably provided; a low table, small plates, little glasses, and, in short, every thing was so fitted, as if all things had been dwindled to their own standard.

But the most complete history of a dwarf is preserved by M. Daubenton, in his Natural History. This dwarf, whose name was Baby, was well known, having spent the greatest part of his life at Luneville, in the palace of Stanislaus, the titular king of Poland. He was born in the village of Plaisne, in France, in the year 1741. His father and mother were peasants, both of good constitutions, and inured to a life of husbandry and labor. Baby, when born, weighed but a pound and a quarter. We are not informed of the dimensions of his body at that time, but we may conjecture they were very small, as he was presented on a plate to be baptized, and for a long time lay in a slipper. His mouth, although proportioned to the rest of his body, was not, at that time, large enough to take in the nipple; and he was, therefore, obliged to be suckled by a she-goat that was in the house, and that served as a nurse, attending to his cries with a kind of maternal fondness. He began to articulate some words when eighteen months old; and at two years he was able to walk alone. He was then fitted with shoes that were about an inch and a half long. He was attacked with several acute disorders; but the small-pox was the only one which left any marks behind it. Until he was six years old, he ate no other food but pulse,

potatoes, and bacon. His father and mother were, from their poverty, incapable of affording him any better nourishment; and his education was little better than his food, being bred up among the rustics of the place. At six years old, he was about fifteen inches high; and his whole body weighed but thirteen pounds. Notwithstanding this, he was well proportioned and handsome: his health was good, but his understanding scarcely passed the bounds of instinct. It was at that time that the king of Poland, having heard of such a curiosity, had him conveyed to Luneville, gave him the name of Baby, and kept him in his palace.

Baby, having thus quitted the hard condition of a peasant, to enjoy all the comforts and conveniences of life, seemed to receive no alteration from his new way of living, either in mind or person. He preserved the goodness of his constitution till about the age of sixteen, but his body seemed to increase very slowly during the whole time; and his stupidity was such, that all instructions were lost in improving his understanding. He could never be brought to have any sense of religion, nor even to show the least signs of a reasoning faculty. They attempted to teach him dancing and music, but in vain; he never could make any thing of music; and as for dancing, although he beat time with tolerable exactness, yet he could never remember the figure, but while his dancing-master stood by to direct his motions. Notwithstanding, a mind thus destitute of understanding was not without its passions; anger and jealousy harassed it at times; nor was he without desires of another nature.

At the age of sixteen, Baby was twenty-nine inches high; at this he rested; but having thus arrived at his acme, the alterations of puberty, or rather, perhaps, of old age, came fast upon him. From being very beautiful, the poor little creature now became quite deformed; his strength quite forsook him; his back bone began to bend; his head hung forward; his legs grew weak; one of his shoulders turned awry; and his nose grew disproportionably large. With his strength, his natural spirits also forsook him; and, by the time he was twenty, he was grown feeble, decrepid, and marked with the strongest impression of old age. It had been before remarked by some, that he would die of old age before he arrived at thirty; and, in fact, by the time he was twenty-two, he could scarcely walk a hundred paces, being worn with the multiplicity of his years, and bent under the burthen of protracted life. In this year he died; a cold, attended with a slight fever, threw him into a kind of lethargy, which had a few momentary intervals; but he could scarcely be brought to speak. However, it is asserted, that in the last five days of his life, he showed a clearer understanding than in his times of best health: but at length he died, after enduring great agonies, in the twenty-second year of his age.

Baby, it is evident, was a creature calculated rather to excite pity or disgust than any other feeling,—a being as stunted in mind as in body. But to these diminutive beings nature does not always forget to give intellectual

faculties. Jeffery Hudson, to whom Buffon alludes as the dwarf of the English court, was a brave and intelligent man. He killed, in a duel, Mr Cutts, who had insulted him; and he served as a captain in the royal army. In modern times, we have an instance of a dwarf possessed of every mental and personal accomplishment. Count Borulawski was the son of a Polish nobleman attached to the party of King Stanislaus, and who lost his property in consequence of that attachment. His father had six children, three dwarfs, and three of the ordinary stature; and it is a singular circumstance, that they were born alternately, a big and a little one. The Count's youngest sister, who died at the age of twenty-three, was of a much more diminutive size than he was. He grew till he was thirty, when he was three feet two inches in height. The proportions of his figure were perfectly correct, which is rarely the case with dwarfs, and his look was manly and noble. His manners were full of grace and politeness; his temper was good; and he possessed a lively wit, united with an excellent memory and a sound judgment. Till the age of forty-one, he lived in the enjoyment of perfect health, and of all the comforts of life, under the patronage of a lady, who was a friend of the family. He then married a lady, of the middle size, by whom he had three children, none of whom were dwarfs. To procure the means of subsistence for his family, he at first gave concerts in the principal cities of Germany; on which occasions he played upon the guitar, of which instrument he was a perfect master. At Vienna he was persuaded to turn his thoughts to England, where it was supposed that the public curiosity would in a little time benefit him sufficiently to enable him to live independent in a country so cheap as Poland. Borulawski accordingly visited England, where he was admired, and extensively patronized, by the nobility and gentry. He exhibited himself in London, Edinburgh, Dublin, Bath, and most of the principal cities and towns, and wherever he went he gained friends. Borulawski died a few years since. He published his own memoirs.

Of GIANTS we have several accounts from mariners, that a nation actually exists; and mere speculation should never induce us to doubt their veracity. Ferdinand Magellan was the first who discovered this race of people along the coast, towards the extremity of South America. Magellan was a Portuguese of noble extraction, who having long behaved with great bravery, under Albuquerque, the conqueror of India, he was treated with neglect by the court, upon his return. Applying, therefore, to the king of Spain, he was entrusted with the command of five ships, to subdue the Molucca Islands; upon one of which he was slain. It was in his voyage thither, that he happened to winter in St Julian's Bay, an American harbor, forty-nine degrees south of the line. In this desolate region, where nothing was seen but objects of terror, where neither trees nor verdure dressed the face of the country, they remained for some months without seeing any human creature. They had judged the country to be utterly uninhabitable, when

one day they saw approaching, as if he had been dropped from the clouds a man of enormous stature, dancing and singing, and putting dust upon his head, as they supposed in token of peace. This overture for friendship was, by Magellan's command, quickly answered by the rest of his men; and the giant approaching, testified every mark of astonishment and surprise. He was so tall, that the Spaniards only reached his waist; his face was broad, his color brown, and painted over with a variety of tints; each cheek had the resemblance of a heart drawn upon it; his hair was approaching to whiteness; he was clothed in skins, and armed with a bow. Being treated with kindness, and dismissed with some trifling presents, he soon returned with many more of the same stature; two of whom the mariners decoyed on shipboard: nothing could be more gentle than they were in the beginning; they considered the fetters that were preparing for them, as ornaments, and played with them, like children with their toys; but when they found for what purpose they were intended, they instantly exerted their amazing strength, and broke them in pieces with a very easy effort. This account, with a variety of other circumstances, has been confirmed by succeeding travellers.*

To these varieties in the human species might be added a considerable catalogue of Monsters; but as few of these have survived the hour of their birth, and as the detail of most of them can serve but to disgust, we shall only trouble the reader with a few instances. The first is an affecting account of the most singular production of this kind that stands recorded in the History of Nature.

On the 26th of October, 1701, at Tzoni, in Hungary, two female children were born, which were united together at the loins. They lived to the age of twenty-one years. At seven years of age they were carried into Holland, England, Italy, Russia, and into almost every country of Europe. At the age of nine they were purchased by a pious clergyman, in order to place them in a convent at Petersburgh, where they remained till the 25th of February, 1723, when they died.

One of these twins was named Helen, and the other Judith. Helen grew tall, and was straight. Judith was less, and a little crooked. As they were united at the loins, they could only see one another by turning their heads. They in general agreed well together, and loved each other affectionately. At six years of age Judith was affected with a palsy on the left side; and though afterwards she appeared cured, she always retained a strong impression of that malady, and her mind was always heavy and weak. Helen, on the contrary, was handsome and gay. She had a good understanding, and some wit. They had the small-pox and the measles at the same time; but

* The soberer narratives of recent travellers have reduced the stature of the Patagonians to a more reasonable standard; though still leaving them the character of being a tall race. From five feet ten, to six feet seven inches, appears to be the height of the individuals of this tribe.

they had other maladies or indispositions separately: for Judith was subject to a cough and a fever; Helen, on the contrary, enjoyed good health. When they were nearly twenty-one years of age, Judith took a fever, fell into a lethargy, and died; the unfortunate Helen was obliged to follow her lot. Three minutes before the death of Judith, she fell into an agony, and died almost at the same moment.

A pair united in a similar manner, has recently been exhibited in the United States and England. They, too, were born in the east, and are known as the Siamese youths. A fleshy band, of from four to six inches long and two broad, proceeding from the pit of each stomach, connects them together. The entire band admits four fingers to pass freely behind it, when the boys stand shoulder to shoulder, and its width and thickness allow the thumb to meet the fingers on the front aspect. The vestiges of one common navel are visible at the lower and middle part of the band, and it is equidistant between the two bodies. The band is hollow, except about an inch in the centre, and there is evidently a hernial protrusion into it from each of the boys, in the action of coughing. Their appearance is healthy, their dispositions cheerful, and their attitudes and motions graceful. They move across the room with all the ease and grace of a couple skilfully waltzing, and seem never to have any difference of intention or purpose which can give pain to their band of union by making them draw different ways. The natural position of the youths, or that which seems to place the connecting ligament in its natural form, is that of face to face. This position, as must be obvious, is extremely inconvenient, and the boys have consequently accustomed themselves to stand or move side by side. Their persons are thus drawn mutually closer, which makes it necessary for one to place his arm about the neck or waist of the other. The position may be varied—that is, the ligament may be made an axis, upon which the youths can turn and bring in contact the two opposite sides, instead of those which were first in collision. Their identity of purpose, and unity of movement, combined with a general similarity of tastes, dispositions, and habits, has created in some a suspicion that their organization was more intimately connected than at first sight appears. They eat, drink, and sleep simultaneously; their health is affected alike; and on being conveyed through the streets in a coach, so perfect is their unity of *action*, that they could not be prevailed upon to look out of its opposite windows. These circumstances many have been disposed to attribute to something more than the power of habit; but there can be no doubt that the youths are perfectly distinct beings, having each his organization totally independent of the other. This is placed beyond a doubt by various circumstances. No one can fail to be touched with the perfect harmony that subsists between them. Attempts have been made to create jealousies between them, but without the slightest success. Any gift which they receive capable of division, is shared between them; and any description of present passes from one to the

other as a joint possession. It would perhaps be more just to say, that they recognize no difference between themselves. A very attentive observer, however, will not fail to discover, between these two boys, who certainly bear the strongest possible resemblance to each other, a marked distinction. One seems to be a little more robust than the other, and even to possess an intellectual superiority over his brother. Perhaps this notion acquires plausibility from the circumstance that the former generally acts as the organ of communication on the joint part with the interpreters. It is observed, that this superior brother yields on all occasions to the impulses of the weaker, giving up his own choice, and preferring the course intimated by the other. The inferior brother then playfully leans against his mate for support, or the one pats the cheek, or presses the forehead, or adjusts the shirt collar of the other, in such a way as betrays the kindliest feelings in each, and the tenderest affection for each other.

A still more wonderful *lusus naturæ* lately existed in the person of a bicephalous girl, born of Sardinian parents. She died recently at Paris. Ritta, or the right side of the infant, had been ill for three days, and her illness did not appear in any degree to influence the health of Christina, the other side; so that at the moment when Ritta had given up the ghost, Christina was hanging to the breast of her mother, and playing with her face. But suddenly she let go, heaved a sigh, and expired. On dissection, two hearts, touching at the upper surface, but perfectly free at the base, were found in one pericardium. There was only one liver, which was evidently formed by the juncture of two; but there were two stomachs, and two small intestines, the latter of which joined ten or twelve inches above the *cæcum*. The *cæcum* was single, and all below was the same. In the pectoral cavity there was only one diaphragm, which had evidently been formed out of those of two subjects.

ORDER SECOND—QUADRUMANA.[1]

The order Quadrumana is divided into two families, the Simiæ or Apes, and the Lemures.

APES.[2]

If the conformation of the body always implied corresponding intellectual attributes, the apes should approach the nearest to man in intellect. But

[1] This order embraces animals with three kinds of teeth, incisors, canines, and molars; four extremities, terminated by hands, with the thumb separate from the other fingers, and more or less opposable to them; fingers long and flexible; two or four pectoral mammæ; clavicles complete; bones of the arm and leg distinct, and susceptible of the motions of pronation and supination; male organs of generation external; stomach membranous, simple; intestines of medium length; a small cæcum; orbital and temporal fossæ distinct.

[2] This family is distinguished by a form approaching more or less to that of man; four inclined incisors in each jaw; nose more or less prominent; nostrils more or less separated from one another; two pectoral mammæ; orbital and temporal fossæ distinct.

this is not found to be the case: and though the family of apes have, like man, their anterior hands free, and their thumbs opposable, though in a less degree, yet it is not found that their sagacity is superior or even equal to that of some other tribes of mammiferous animals. The structure of their body indeed enables them to perform many movements similar to those of man; but these, when they approach the usages of the human race, are in general the effect of mere education or imitation, in individuals withdrawn from their kind. Possessed of hands at both extremities, capable, were they directed by intelligence, of turning the soil or the inhabitants of the forests to their use, they are inferior in sagacity to the beaver and many other animals which live in society. The social instinct of the apes, indeed, seems limited to the tendency which frugivorous animals have in general to live in wandering troops, for the purposes of mutual protection.

The whole structure of apes marks them as essentially formed for climbing trees, and it is in forests, accordingly, that they are chiefly found. Their gait on the ground, and on all fours, as quadrupeds, is awkward and by leaps; and their head not being placed in equilibrium on the spine as in man, their pelvis being small, and the muscles of the thigh being attached lower in the leg, prevents their assuming the erect posture. Their very long arms and hands at both extremities, are, on the contrary, admirably calculated for their mode of life.

The apes are lively, petulant, and extremely lascivious. They possess the talent of imitation to a great degree, and have the ancient generic denomination of *Simiæ*, from *Simulare*, to imitate. Condamine and Bouguer, when making their observations, in South America, on the figure of the earth, were annoyed by domesticated apes, looking through their telescopes, planting signals, running to the pendulum, taking the pen to write, and imitating all the actions of these learned astronomers. Their intelligence is not, however, greater than that of the dog, though their imitative actions appear advantageously from their particular conformation. Their senses of touch, of smell, and of taste, are particularly acute, and seem to direct all their appetites, which are sensual and gross in almost all the species.

Apes bring forth one or two young at a birth, after a gestation of from five to seven months, according to the species. The females carry their young in their arms or upon their backs, offer them suck, amuse them, and sometimes strike or bite them, when they are dissatisfied. Among the Sapajous, or American apes with prehensile tails, the young seat themselves upon the haunches of the mother, preserving their equilibrium by their tail. The males are polygamous in the smaller species, but often monogamous in the largest. Their geographical range is extremely limited, and they are only found under the tropics in both hemispheres.

THE CHIMPANSÉ.[1]

Cuvier thus describes this remarkable species of ape. "It is covered with black or brown hairs, less thickly in front. If we can trust to the relations of travellers, this animal approaches, or even surpasses, the human stature. But we have not yet seen in Europe any specimen confirmatory, or even indicative, of the truth of this assertion. It inhabits Guinea and Congo—lives in troops—constructs huts of leaves and branches of trees—arms itself with stones and clubs, and employs them to repulse from its dwelling both elephants and men—pursues and carries off the negro women, &c. Naturalists have constantly confounded this animal with the orang outang. In a domesticated state, it becomes gentle enough to be taught to walk upright, and to sit and eat after our manner."

The chimpansé approaches the human form more nearly than any other animal. Unlike the orang outang, it has no intermaxillary bone. It has also the last joint of the great toe perfect. That it has greater facility for the biped or upright mode of locomotion than the orang outang, is also apparent, by its possessing the round ligament of the thigh bone, which the orang has not.

Griffith closes his account of this animal in the following words: "Of the intellectual properties of this species, as we can add little new, we shall not

[1] *Troglodytes niger.* The genus *Troglodytes* comprises Simiæ with four incisor teeth above, and four below; two canines above, and two below; ten molars above, and ten below—in all, thirty-two teeth. Canines little projecting: contiguous to the incisors and molars, as those of man; head rounded; muzzle little projecting; superciliary ridge prominent; facial angle, fifty degrees; arms almost proportioned to the legs, reaching to the bottom of the thighs; thumbs long and opposable; no tail cheek pouches, intermaxillary bones, nor callosities on the buttocks.

say much. If the account of Grand Pré, and other travellers, can be relied on, its intelligence seems to surpass that of the orang outang. Docility, submissiveness, and an apparent melancholy, have marked the characters of the few young specimens brought to Europe, rather than any mental acuteness, surpassing that found in most of the species of the quadrumanous race in general." This animal has been frequently taken, on the coast of Africa, and carried to Europe.

THE ORANG OUTANG.

The average height of the species is from three to four and a half feet. The body is covered with coarse red hairs. The forehead equals in height

[1] *Pithecus Satyrus.* The genus Pithecus embraces Simiæ, with four incisor teeth above and four below; canines two above, and two below; molars ten above, and ten below. Canine teeth a little longer than the others; molars more square than in man, with tubercles more prominent; head rounded; no superciliary ridge, at least in young individuals; facial angle fifty to sixty-five degrees; arms excessively long; thumbs pretty short; no tail, or cheek pouches; callosities on the buttocks in some species; ears rounded, similar to those of man.

one half of the rest of the visage. The face is bluish. There are neither pouches in the cheeks, nor callosities on the posteriors. The hinder thumbs are remarkably short. This celebrated ape resembles man more nearly than any other animal, in the form of the head and the volume of the brain.

The natural history of the orang outang has been miserably disfigured by the mixture of it with that of other apes of the larger size, more especially with that of the chimpansé. Upon a critical examination, (says Cuvier,) I have ascertained that he inhabits the most oriental countries only, as Malacca, Cochin China, and particularly the great island of Borneo, whence he has been brought to Europe by way of Java, though but rarely. He is gentle, easily tamed, and capable of attachment. From the character of his physical conformation, he can arrive at some facility in the imitation of several human actions; but his intelligence by no means equals the exaggerated accounts we have received of it, nor does it appear to surpass much that of the canine species. Camper has discovered, and ably described, two membranous sacs, which produce a thickness and hoarseness in the voice; but he was wrong in believing that the nails are always wanting on the hinder thumbs.

We are in possession of some very minute and labored descriptions of this animal, especially by M. Cuvier, Professor Camper, Tilesius, and Dr Abel. The last we shall present to the reader in the author's own words, as scientific, useful, and highly interesting.

"The hair of the orang outang is of a brownish red color, and covers his back, arms, legs, and outside of his hands and feet. On the back it is in some places six inches long, and on his arms five. It is thinly scattered over his hands and feet, and is very short. It is directed downwards on the back, upper arm, and legs, and upwards on the fore arm. The face has no hair except on its sides, somewhat in the manner of whiskers, and a very thin beard. The shoulders, elbows, and knees, have fewer hairs than other parts of the arms and legs. The palms of the hands and feet are quite naked.

"The prevailing color of the animal's skin, when naked, or seen through the hair, is a bluish gray.

"The head, viewed in front, is pear-shaped, expanding from the chin upwards, the cranium being much the larger end. The eyes are close together, of an oval form, and dark brown color. The eyelids are fringed with lashes, and the lower ones are saccular and wrinkled. The nose is scarcely raised above the level of the face, except at the nostrils, which are but little elevated: their openings are narrow and oblique. The mouth is very projecting, and of a roundish mammillary form. Its opening is large and when closed is marked by little more than a narrow seam. The lips are very narrow, and scarcely perceptible when the mouth is shut. The chin projects less than the mouth: below it, a pendulous membrane gives the appearance of a double chin, and swells out when the animal is angry

or much pleased. Each of the jaws contains twelve teeth; namely, four incisive teeth, the two middle ones of the upper jaw being twice the width of the lateral; two canine, and six molar teeth. The ears are small, closely resembling the human ear, and have their lower margins in the same line with the external angles of the eyes.

"The chest is wide compared with the pelvis: the belly is very protuberant. The arms are long in proportion to the height of the animal. The legs are short, compared with the arms.

"The hands are long, compared with their width and with the human hand. The fingers are small and tapering: the thumb is very short, scarcely reaching the first joint of the fore finger. All the fingers have very perfect nails, of a blackish color, and oval form, and exactly terminating with the extremities of the fingers. The feet are long, and resemble hands, in the palms, and in having fingers rather than toes, but have heels resembling the human. The great toes are very short, are set on at right angles to the feet close to the heel, and are entirely without nails.

"The orang outang of Borneo, is utterly incapable of walking in a perfectly erect posture. He betrays this in his whole exterior conformation, and never voluntarily attempts to counteract its tendency. His head leaning forward, and forming a considerable angle with the back, throws the centre of gravity so far beyond the perpendicular, that his arms, like the fore legs of other animals, are required to support the body. So difficult, indeed, is it for him to keep the upright position for a few seconds, under the direction of his keeper, that he is obliged, in the performance of his task, to raise his arms above his head, and throw them behind him, to keep his balance. His progressive motion on a flat surface is accomplished by placing his bent fists upon the ground, and drawing his body between his arms: moving in this manner, he strongly resembles a person decrepit in the legs, supported on crutches. In a state of nature he probably seldom moves along the ground; his whole external configuration showing his fitness for climbing trees, and clinging to their branches. The length and pliability of his fingers and toes enable him to grasp with facility and steadiness, and the force of his muscles empowers him to support his body for a great length of time by one hand or foot. He can thus pass from one fixed object to another, at the distance of his span from each other, and can obviously pass from one branch of a tree to another, through a much greater interval. In sitting on a flat surface, this animal turns his legs under him. In sitting on the branch of a tree, or on a rope, he rests on his heels, his body leaning forward against his thighs. This animal uses his hands like others of the monkey tribe."

The individual described by Dr Abel, "on his arrival in Java from Batavia, was allowed to be entirely at liberty, till within a day or two of being put on board the Cæsar to be conveyed to England; and whilst at large, made no attempt to escape: but became violent when put into a large

railed bamboo cage, for the purpose of being conveyed from the island. As soon as he felt himself in confinement, he took the rails of the cage into his hands, and shaking them violently, endeavored to break them in pieces; but finding that they did not yield generally, he tried them separately, and, having discovered one weaker than the rest, worked at it constantly, till he had broken it, and made his escape. On board ship, an attempt being made to secure him by a chain tied to a strong staple, he instantly unfastened it, and ran off with the chain dragging behind; but finding himself embarrassed by its length, he coiled it once or twice, and threw it over his shoulder. This feat he often repeated; and when he found it would not remain on his shoulder, he took it into his mouth.

"After several abortive attempts to secure him more effectually, he was allowed to wander freely about the ship, and soon became familiar with the sailors, and surpassed them in agility. They often chased him about the rigging, and gave him frequent opportunities of displaying his adroitness in managing an escape. On first starting, he would endeavor to outstrip his pursuers by mere speed; but when much pressed, eluded them by seizing a loose rope, and swinging out of their reach. At other times, he would patiently wait on the shrouds, or at the mast head, till his pursuers almost touched him, and then suddenly lower himself to the deck by any rope that was near him, or bound along the mainstay, from one mast to the other, swinging by his hands, and moving them one over the other. The men would often shake the ropes by which he clung with so much violence, as to make me fear his falling; but I soon found that the power of his muscles could not be easily overcome. When in a playful humor, he would often swing within arm's length of his pursuer, and, having struck him with his hand, throw himself from him.

"Whilst in Java, he lodged in a large tamarind-tree, near my dwelling, and formed a bed by intertwining the small branches, and covering them with leaves. During the day, he would lie with his head projecting beyond the nest, watching whoever might pass under; and when he saw any one with fruit, would descend to obtain a share of it. He always retired for the night at sunset, or sooner if he had been well fed, and rose with the sun, and visited those from whom he habitually received food.

"Of some small monkeys on board from Java, he took little notice, whilst under the observation of the persons of the ship. Once, indeed, he openly attempted to throw a small cage, containing three of them, overboard, because, probably, he had seen them receive food, of which he could obtain no part. But although he held so little intercourse with them when under our inspection, I had reason to suspect that he was less indifferent to their society when free from our observation; and was one day summoned to the top-gallant yard of the mizen-mast to overlook him playing with a young male monkey. Lying on his back, partially covered with a sail, he for some time contemplated, with great gravity, the gambols of the monkey,

which bounded over him; but at length caught him by the tail, and tried to envelope him in his covering. The monkey seemed to dislike his confinement, and broke from him, but again renewed his gambols, and although frequently caught, always escaped. The intercourse, however, did not seem to be that of equals, for the orang outang never condescended to romp with the monkey, as he did with the boys of the ship. Yet the monkeys had evidently a great predilection for his company; for whenever they broke loose, they took their way to his resting place, and were often seen lurking about it, or creeping clandestinely towards him. There appeared to be no gradation in their intimacy; as they appeared as confidently familiar with him when first observed, as at the close of their acquaintance.

"But although so gentle when not exceedingly irritated, the orang outang would be excited to violent rage, which he expressed by opening his mouth, showing his teeth, and seizing and biting those who were near him. Sometimes, indeed, he seemed almost driven to desperation; and, on two or three occasions, committed an act, which, in a rational being, would have been called the threatening of suicide. If repeatedly refused an orange when he attempted to take it, he would shriek violently, and swing furiously about the ropes; then return and endeavor to obtain it: if again refused, he would roll for some time like an angry child upon the deck, uttering the most piercing screams; and then suddenly starting up, rush furiously over the side of the ship and disappear. On first witnessing this act, we thought that he had thrown himself into the sea; but, on a search being made, found him concealed under the chains.

"This animal neither practices the grimaces and antics of other monkeys, nor possesses their perpetual proneness to mischief. Gravity, approaching to melancholy, and mildness, were sometimes strongly expressed in his countenance, and seem to be the characteristics of his disposition. When he first came among strangers, he would sit for hours with his hand upon his head, looking pensively at all around him; and when much incommoded by their examination, would hide himself beneath any covering that was at hand. His mildness was evinced by his forbearance under injuries, which were grievous before he was excited to revenge; but he always avoided those who often teazed him. He soon became strongly attached to those who used him kindly. By their side he was fond of sitting; and getting as close as possible to their persons, would take their hands between his lips, and fly to them for protection. From the boatswain of the Alceste, who shared his meals with him, and was his chief favorite, although he sometimes purloined the grog and the biscuit of his benefactor, he learned to eat with a spoon; and might be often seen sitting at his cabin door, enjoying his coffee, quite unembarrassed by those who observed him, and with a grotesque and sober air, that seemed a burlesque on human nature.

"Next to the boatswain, I was, perhaps, his most intimate acquaintance. He would always follow me to the mast-head, whither I often went for the

sake of reading apart from the noise of the ship; and, having satisfied himself that my pockets contained no eatables, would lie down by my side, and pulling a topsail entirely over him, peep from it occasionally to watch my movements.

"His favorite amusement in Java, was in swinging from the branches of trees, in passing from one to another, and in climbing over the roofs of houses; on board, in hanging by his arms from the ropes, and in romping with the boys of the ship. He would entice them into play by striking them with his hand as they passed, and bounding from them, but allowing them to overtake him, and engage in a mock scuffle, in which he used his hands, feet, and mouth. If any conjecture could be formed from these frolics, of his mode of attacking an adversary, it would appear to be his first object to throw him down, then to secure him with his hands and feet, and then wound him with his teeth.

"On board ship, he commonly slept at the mast-head, after wrapping himself in a sail. In making his bed, he used the greatest pains to remove every thing out of his way, that might render the surface on which he intended to lie, uneven; and, having satisfied himself with this part of his arrangement, spread out the sail, and lying down upon it on his back, drew it over his body. Sometimes I pre-occupied his bed, and teased him by refusing to give it up. On these occasions, he would endeavor to pull the sail from under me, or to force me from it, and would not rest till I had resigned it. If it were large enough for both, he would quietly lie by my side. If all the sails happened to be set, he would hunt about for some other covering, and either steal one of the sailors' jackets or shirts that happened to be drying, or empty a hammock of its blankets. Off the Cape of Good Hope, he suffered much from a low temperature, especially early in the morning, when he would descend from the mast, shivering with cold, and running up to any one of his friends, climb into their arms, and clasping them closely, derive warmth from their persons, screaming violently at any attempt to remove him.

"His food in Java was chiefly fruit, especially mangostans, of which he was extremely fond. He preferred coffee and tea, but would readily take wine, and exemplified his attachment to spirits by stealing the captain's brandy bottle. Since his arrival in London, he has preferred beer and milk to any thing else, but drinks wine and other liquors.

"In his attempts to obtain food, he afforded us many opportunities of judging of his sagacity and disposition. He was always very impatient to receive it when held out to him, and became passionate when it was not soon given up; and would chase a person all over the ship to obtain it. I seldom came upon deck without sweetmeats or fruit in my pocket, and could never escape his vigilant eye. Sometimes I endeavored to evade him by ascending to the mast-head, but was always overtaken or intercepted in my progress. When he came up with me on the shrouds, he would secure

himself by one foot on the rattlings, and confine my legs with the other and one of his hands, while he rifled my pockets. If he found it impossible to overtake me, he would climb to a considerable height on the rigging, and then drop suddenly upon me. Or if, perceiving his intention, I attempted to descend, he would slide down a rope, and meet me at the bottom of the shrouds. Sometimes I fastened an orange to the end of a rope, and lowered it to the deck from the mast-head; and as soon as he attempted to seize it, drew it rapidly up. After being several times foiled in endeavoring to obtain it by direct means, he altered his plan. Appearing to care little about it, he would remove to some distance, and ascend the rigging very leisurely for some time, and then, by a sudden spring, catch the rope which held it. If defeated again by my suddenly jerking the rope, he would, at first, seem quite in despair, relinquish his effort, and rush about the rigging, screaming violently. But he would always return, and again seizing the rope, disregard the jerk, and allow it to run through his hand till within reach of the orange; but if again foiled, would come to my side, and taking me by the arm, confine it while he hauled the orange up.

"I have seen him exhibit violent alarm on two occasions only, when he appeared to seek for safety in gaining as high an elevation as possible. On seeing eight large turtles brought on board, whilst the Cæsar was off the Island of Ascension, he climbed with all possible speed to a higher part of the ship than he had ever before reached, and, looking down upon them, projected his long lips into the form of a hog's snout, uttering at the same time a sound which might be described as between the croaking of a frog and the grunting of a pig. After some time, he ventured to descend, but with great caution, peeping continually at the turtles, but could not be induced to approach within many yards of them. He ran to the same height, and uttered the same sounds, on seeing some men bathing and splashing in the sea; and since his arrival in England, has shown nearly the same degree of fear at the sight of a live tortoise."

This animal survived his transportation to England, from August, 1817, (when he arrived,) to the 1st of April, 1819, during which interval he was in the custody of Mr Cross, at Exeter 'Change, as much caressed for the gentleness of his disposition, as he was noticed for his great rarity. There was no need of personal confinement, and little of restraint or coercion; to his keepers, especially, and to those whom he knew by their frequent visits, he displayed a decided partiality. During his last illness, and at his death, his piteous appearance, which seemed to bespeak his entreaties to those about him for relief, did not fail to excite the feelings of all who witnessed them; an excitement evidently heightened by the recollection of human suffering under similar circumstances, which the sight of this animal so strongly brought to mind. He was shedding his teeth at the period of his death, which was probably promoted, if not caused by it.

Of the many attempts to transport the orang outang alive to Europe, we believe only one or two have been successful. In 1825, one was brought to Boston, from Batavia, by Captain Blanchard, but unfortunately it died in the harbor before landing. Captain Shirley, who arrived there from Batavia, in June, 1831, was more fortunate. He brought a young orang outang, which is now in good health, and has every prospect of enduring the climate. It is a female of about three years old, and was procured originally in Borneo. The interest excited in respect to this animal, as well by its own extraordinary characteristics, as by the variety of accounts that authors have given of it, has induced us to examine it with some care. We have also caused a correct likeness to be taken, which is the one at the head of the present article.

In comparing this animal with the preceding description, by Dr Abel, we find it remarkably accurate and complete. We observe that the thumb of the hinder hand has no nail, and it seems that in nine cases mentioned by Dr Abel, the same fact existed. Two instances to the contrary, however, are cited; one by Tilesius, the other by Cuvier. We also remarked that the thumb is placed nearly at right angles to the hand, inclining a little toward the wrist.

THE GIBBON, OR LONG-ARMED APE,[1]

Always keeps in an erect posture, even when it walks upon all fours; its arms being as long as its body and legs put together. We have seen one of these animals alive. It had no appearance of any tail; it had a circle of gray, bushy hair, all round the face, which gave it a very remarkable appearance. Its eyes were large, and sunk in its head; its face resembling that of a man, tanned, and its ears well proportioned. This ape appeared to us to be of a gentle and tractable disposition; its motions were neither rash nor precipitate. It was fed on bread, fruit, almonds, &c., and calmly received

[1] *Pithecus lar*. The gibbons, of which there are several, have the long arms of the orang, the low forehead of the chimpansé, and callosities on the buttocks. They have no tail or cheek pouch.

the fruit that was presented to it; it was very averse to cold and wet weather, and did not long live after being brought from its native country. It is a native of the East Indies, and particularly, found along the coasts of Coromandel, Malacca, and the Molucca Islands.

THE SIAMANG.[1]

These animals are black all over, and have two naked folds of skin on the neck, which are occasionally inflated. The hair is long and soft. They are very common in Sumatra. They are generally found assembled in large troops, conducted, it is said, by a chief, whom the Malays believe invulnerable. Thus assembled at sunrise, and again at sunset, they vie with each other in making the most dreadful cries, perfectly stunning to those accustomed to them, and frightful in the highest degree to strangers. At all other times they appear to be perfectly quiet, as long at least as they are undisturbed.

Maternal affection will triumph over every other passion, and the mother of a young one, which has been wounded, will immediately throw away her life in an attack on an enemy. This affection is also displayed under more pleasing circumstances, and their care of the persons of their young

[1] *Pithecus syndactylus.*

by washing, rubbing, and drying them, in spite of the pettish cries and resistance of the infant siamang, is highly ludicrous and amusing.

THE MALBROUCK.[1]

These animals are found in Bengal,* where travellers inform us they plunder whole fields of grain, and plantations of sugar-canes; and while one stands sentinel on a tree, the others load themselves with the booty. But if the owner of the field or plantation appears, to interrupt their depredations, their faithful companion on the look-out, gives notice, by crying out, *houp*, *houp*, *houp*, which the rest perfectly understand; and, all at once, throwing down their plunder which they hold in their left hands, they scamper off upon three legs, holding the remainder in their right, and save themselves from their pursuers by climbing up trees, where they have their general abode. The females, even loaded with their young ones, clasp them close to their breast, leap like the others, from branch to branch, and escape with the rest. When it happens that they cannot find any provision in the fields, they get on the tops of houses, and, having pulled off the tiles, do great damage to the inside. They do not eat a single thing, without smelling at it for a long time beforehand; and when they have satisfied their hunger, they put the remainder in their cheek pouches, for the next day: they destroy the nests of birds, and never fail to throw the eggs on the ground, when they want appetite or inclination to eat them.

The most formidable enemy these animals have, is the serpent; no other animal of the forest being able to surprise them, as they are so exceedingly swift and subtle, and easily climb up and seat themselves on the tops of the highest trees. The monkey, (says a traveller,) has it in his power to be master of the forest; for there are neither tigers nor lions which can dispute the possession with it. The chief animal it has to fear, and which attacks it both night and day, is the snake. There are some snakes in those forests of a prodigious size, which wind up the trees where the monkeys reside, and, when they happen to surprise them sleeping, swallow them whole before the little animals have time to make a defence.

The malbrouck has pouches on each side of its cheeks, and callosities on

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[1] *Cercocebus cynosurus*. The *Cercocebus* is a sub-genus of the *Cercopithecus*, which includes Simiæ with four upper and four lower incisors; canines, two upper and two lower; molars, ten upper and ten lower. Canines a little projecting, with intermediate spaces for their reception; posterior molars with only four tubercles. Head rounded; facial angle, forty-five to fifty degrees; ears sometimes rounded, sometimes slightly angular; thumbs distinct, more or less approaching to the fingers; cheek pouches; callosities on the buttocks, with the exception of one species; tail as long at least as the body, often turned up on the back.

* Some later naturalists are of opinion, that the malbrouck is not a native of India, but of Africa.

its posteriors; its tail is very nearly as long as the body and head put together. The eyelids are of a fleshy, and the face of an ash color; the ears are large, thin, and of a flesh color; they have a list of gray hairs above the eyes, but in other parts are of a uniform color, approaching towards a brown on the upper parts of the body, and towards a gray on the lower. It goes on all fours, and is about a foot or a foot and a half long, from the snout to the insertion of the tail.

THE MAIMON, OR PIG-TAILED BABOON,[1]

Which is a native of the banks of the Ganges, has pouches on each side of its cheeks, and callosities on its posteriors; its tail is naked, curled up, and about the length of five or six inches; the canine teeth are not much longer in proportion, than those of men; the face, ears, hands, and feet, are naked, and of a flesh color; the hair on the body is of a beautiful greenish gray, each hair being gray and black, tipped with yellow; the extremities are gray; the region of the loins is a golden yellow; and the thighs are of a lively red. It sometimes walks erect, and at other times upon all fours: it is about two feet or two feet and a half tall, when erect. It is a spiteful animal.

THE MAGOT, OR BARBARY APE.[2]

This animal is generally known by the name of the Barbary ape. Of all the apes which have no tail, this animal can best endure the temperature of a northern climate. Buffon kept one for many years. In the summer it remained in the open air with pleasure; and in the winter might be kept in a room without any fire. It was filthy, and of a sullen disposition: it equally made use of a grimace to show its anger, or express its sense of hunger; its motions were violent, its manners awkward, and its physiognomy rather ugly than ridiculous. Whenever it was offended, it grinned and showed its teeth. It put whatever was given it into the pouches on each side of its jaws, and commonly eat every thing that was offered it, except raw flesh, cheese, and other things of a fermentative nature. When it slept, it was fond of roosting on a wooden or iron bar. It was always kept

[1] *Macacus rhesus.* The genus *Macacus*, consists of animals with four upper and four lower incisors; two upper and two lower canines; ten upper and ten lower molars. Canine teeth very strong, above all in the males; the first and second molars have two tubercles on their crown; the three others have four, with the exception of the last of the lower jaw, which has five, and which is terminated by a heel; facial angle, forty to forty-five degrees; superciliary ridges much developed; muzzle broad and projecting; eyes approaching; nostrils oblique; ears naked, close to the head, angular; cheek pouches; lips thin and extensible; callosities on the buttocks.

[2] *Magot inuus.* The *Magot* is a sub-genus of the *Macacus*, characterized by having a simple tubercle, in place of a tail.

chained, for, notwithstanding its long subjection, it was neither civilized, nor fond of its keeper: apparently, it had been but badly educated, for I have seen others of the same kind, who were more sagacious, obedient, gayer, and so tractable as to be taught to dance, and suffer themselves quietly to be clothed and dressed.

This ape is about two feet and a half, or three feet high, in its erect posture; but the female is not so large as the male. It is completely covered with a light gray brown hair. It rather chooses to walk on all fours, than erect. When it sleeps, it is almost always sitting. There are two very prominent callosities on its posteriors. It abounds in Barbary, and in the forests of India, Arabia, and Africa. In Barbary, the trees are sometimes nearly covered with them. This ape is said to have become naturalized in the most inaccessible parts of the rock of Gibraltar.

It is probably this kind of monkey, which Robert Lade speaks of, in the following terms: "We travelled over a great mountain at the Cape of Good Hope, where we diverted ourselves with hunting the large apes, which are there in great plenty. I am not able to represent all the tractableness of these animals which pursued us, nor the swiftness and impudence with which they returned to us after we had driven them away. Sometimes they suffered us to approach so near them, that, stopping almost close to one of these animals to take my observations, I thought myself certain of securing him, when, taking a sudden leap, he sprang above ten paces from me, and climbed up a tree with the greatest agility. They remained afterwards very quiet, looking on us as though they were pleased with our astonishment. There were some so exceedingly large, that if they had been of a ferocious nature, our number would not have been sufficient to secure us from their attacks. As it would have been useless to kill these animals, we made no use of our guns; but the captain, thinking to wound one of them, which was seated on a tree, after a long pursuit, had no sooner presented his piece, but the animal, probably from the remembrance of the execution of some of his companions in the same manner, was so greatly terrified at it, that it fell almost motionless at our feet, and being stunned in the fall, we had not the least trouble to secure it: however, when it revived, we had occasion for all our strength and address to keep it, defend-

ing itself by biting those who were near it, which obliged us to bind our handkerchiefs over its head."

Tavernier tells us that some of the inhabitants of India adopt a ludicrous mode of avenging themselves on these monkeys, who not unfrequently attack the women who are going to market, and rob them of their provisions. In an open space, near the retreat of the apes, they place five or six baskets of rice, forty or fifty yards asunder, and near the baskets, a number of stout cudgels, each two feet in length. They then hide themselves, to watch for the result. Thinking that no one sees them, the apes hasten towards the baskets. For a while they grin angrily at each other, then approach, then retire, and seem to dread coming to action for the prey. More daring than the males, the females at length advance to the baskets, and as they thrust in their heads to eat, the males on the one side rush forward to prevent them. This brings on a general engagement, and the cudgels are lustily plied till the weakest party is compelled to seek for shelter in the woods. The victors then quietly fall to, upon their hard-earned meal.

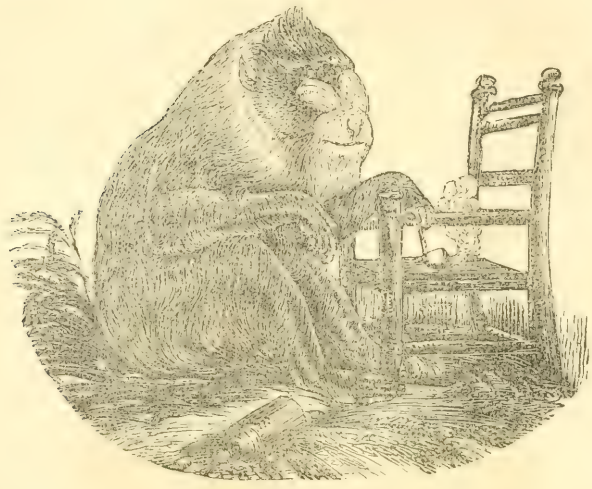
THE PIG-FACED BABOON.[1]

This animal, which is also called the chacma, is a native of Africa, and was formerly exceedingly troublesome to the settlers in the neighborhood

[1] *Cynocephalus porcarius.* The genus *Cynocephalus* comprises Simiæ, with four upper and four lower incisors; two upper, and two lower canines; ten upper, and ten lower molars. Canines very strong; last molar of the under jaw on each side with a heel; head and muzzle much elongated; nostrils placed at the extremity, like the dog; facial angle, thirty to thirty-five degrees; superciliary, sagittal, and occipital ridges, much developed; orbit hollow; maxillary bone much produced; face wrinkled, with longitudinal striæ; ears flat and angular; cheek pouches; members of nearly equal length, and very robust; large callosities.

of the Cape of Good Hope. It is a proper baboon. Its general color is a dusky hue, bordering upon black. The body is from two to three feet in length, and the tail is so short, that, when the animal stands on all fours, it does not reach the ground. The adult has a large mane. The forehead of this species is remarkably depressed; the nose is much prolonged. The voice of the pig-faced baboon has a near resemblance to the bark of a dog.

THE MANDRILL.[1]



This baboon, which also bears the name of the ribbed-nosed baboon, is an ugly, disgusting animal. It is found on the Gold Coast, and in other southern provinces of Africa, where the negroes call it *boggo*, and the Europeans, *mandrill*. This animal is the largest of the baboon kind. Smith relates, that a female mandrill was given to him, which was not above six months old, and had then attained the size of an adult baboon. He likewise acquaints us, that these animals always walk erect; that they sigh and cry like the human species; that they have a violent passion for the female sex; that they never fail to overcome them if they come within their reach.

This animal is equally remarkable for its variety of color, its singularity of appearance, its immense strength, and its unconquerable savageness

[1] *Cynocephalus mormon*

Under its projecting forehead, (says Mr Bingly,) are two small and vivid eyes, situated so near to each other, that their position alone gives to the physiognomy an air of ferocity. An enormous muzzle, indicative of the most brutal passions, terminates in a broad and rounded extremity of a fiery red color, from which continually oozes a mucous humor. The cheeks, greatly swollen and deeply furrowed, are naked, and of a deep blue color. A narrow, blood-colored ridge extends down the middle of the face, and terminates in the nose. Round the neck the hair is very long. On the sides of the head it joins that at the top, and the whole terminates in a somewhat pointed form. Each hair of the body is annulated with black and yellow; so that the whole fur has a greenish brown hue.

One of these animals was exhibited at Charing Cross, London. He sometimes sat in a chair, smoked a pipe, drank spirits and water, and appeared to understand every look and gesture of his keeper. He had a very contented look, and passed under the name of "Happy Jerry."

When standing upright, the mandrill is in height from three feet and a half to five feet. It is to be found on the Gold Coast, in several other parts of Africa, and also in the East Indies and the Indian Archipelago. Its voice bears some resemblance to the roaring of a lion. No art or kindness can in the least subdue its brutal propensities; and its great strength renders it an object of perpetual dread to its keepers. Yet it is not, strictly speaking, a carnivorous animal; for, though it will eat meat that has been cooked, its usual food is fruit and nuts.

THE COAITA.[1]

Next to the warine, and the alouato, the coaita, or four-fingered monkey, is the largest of the *sapajous*.* There was one alive at the Duke of Bouillon's, where, by its familiarity and forward caresses, it merited the affection of those who had it under their care; but in spite of the good treatment and attention paid to it, it could not resist the winter of the year 1764. It differs greatly in disposition from the warine and the alouato, which are wild and untameable. It also differs from them in having but four fingers, and no thumb to the fore paws: by this character alone, and its holding tail, it is

[1] *Ateles paniscus*. The genus *Ateles* has four upper and four lower incisors; two upper and two lower canines; twelve upper and twelve lower molars. Canines a little projecting, crossing one another, conical; molars with blunt crowns, as those of man; head round; face perpendicular; facial angle, about sixty degrees; ears hardened; extremities very long and slender; the anterior ones, generally tetradactyle; thumb, none, or only replaced by a wart, or extremely short, and armed with a little sharp nail; posterior pentadactyle; nail, convex and short; tail extremely long, strongly prehensile, having a part without hair, and covered with a delicate skin toward its extremity.

* The sapajous are apes peculiar to the American continent, having long, prehensile tails.

easily distinguished from the monkey kind. In the use of their tail these animals are singularly dexterous. They can pick up with it even straws and bits of wood; and M. Audebert tells us, that he saw one of the species carry hay in its tail to make its bed, and move and spread it about as easily as an elephant could have done with his trunk.

In climbing, too, this member is of great use. There are, (says Dampier,) in the Isthmus of America, numbers of monkeys, some of which are white, but the most part black—some have beards, others none. These monkeys are very droll, and performed a thousand grotesque postures as we traversed in the woods. When they are unable to leap from one tree to another, on account of the distance, or the tree being separated by a river, their dexterity is very surprising. The whole family form a kind of chain, locking tail in tail, or hand in hand, and one of them holding the branch above, the rest swing down, balancing to and fro like a pendulum, until the undermost is enabled to catch hold of the lower branches of some neighboring tree. When the hold is fixed below, the monkey lets go that which was above, and thus comes undermost in turn; but creeping up along the chain, attains the next branches of the tree like the rest; and thus, they all take possession without ever coming to the ground.

They have the address to break the shell of oysters to eat them. They generally produce only one or two young ones at a time, which they carry upon their backs; they feed upon fish, worms, and insects, but fruit is their general food, and they grow fat when it is ripe, when, it is said, their flesh is good and exquisite eating.

The coaita is about a foot and a half long, and its tail is longer than the head and body measured together: it goes on all fours.

THE WARINE, AND THE ALOUATO, OR HOWLING MONKEY,[1]

Are the largest of these animals, belonging to the new continent: they surpass the size of the largest monkey, and approach the size of the baboon. They have a long tail, and are moreover of the sapajou family, in which they hold a very distinct rank, not only with regard to size, but also to voice, which sounds like a drum, or as others say, like the screaming of immense herds of swine, and may be heard at a very great distance. From the excessive noise which they make, they have obtained the name of the howling monkey. Marcgrave informs us, "that every morning and evening the *warines*

[1] *Mycetes seniculus*. The genus *Mycetes* has four upper and four lower incisors; two upper and two lower canines; twelve upper and twelve lower molars. Canines well developed, triquetrous; head pyramidal; countenance oblique; facial angle, thirty degrees; hyoid bone ventricose, apparent externally, and cavernous. Four extremities pentadactyle; tail very long; strongly prehensile, naked under its extremity; nails convex and short

and the *alouatos* assemble in the woods; that one among them seats himself on an elevated place, makes a sign with his hand to the rest to seat themselves round him; as soon as he sees them all seated, he begins an oration with so quick and loud a voice, that, at a distance, it might be imagined they were all making a noise together. During the whole discourse, the rest keep a profound silence, and when it is ended, he makes a signal to the rest to answer him, and immediately they all set up a cry together, till by another sign with his hand he orders them to be silent; when they are immediately obedient and quiet. Then the first renews his discourse, or his song, which when finished, and the others have paid the utmost attention to it, the whole assembly breaks up and separates." This singular noise is made by the instrumentality of a long bony process in the throat. According to the same author, "the face of the warine is broad, the eyes black and sparkling, the ears short and round, the tail naked at the extremity, with which it holds firmly whatever it encircles; the hair of the body is black, long, and glossy; it is much longer under the chin, which forms a kind of round beard: the hair on the hands, feet, and a part of the tail, is brown. The male is of the same color as the female, and only differs from it in being a little larger. The females carry their young on their backs, and thus loaded leap from branch to branch, and from tree to tree. The young one clasps the narrowest part of the body of the mother with its hands and arms, and thus holds itself firmly fastened, whatever motion its parent makes. In other respects, these animals are wild and mischievous: they can neither be tamed nor subdued, and bite dreadfully. As they live only on fruit, grain, and some insects, their flesh is not bad eating. It is like that of the hare, but a little sweetish, for which reason a good quantity of salt is put to that which is roasted: the fat is the color of its hair. They are both lively, active, and very pleasing by their tricks and nimbleness. They are, however, fantastical in their tastes and affections: they seem to have a strong inclination for some people, and as great an aversion for others. They are natives of French Guiana. They usually live in troops of from twenty to forty individuals. They often whistle, and when they are enraged they shake their heads violently, and utter, in a ferocious tone, the syllables, *Pi, ca, rou.*"

THE SAI, OR WEEPER.[1]

Travellers have described these animals by the name of *howlers*, from their plaintive moan. Others have called them *musk monkeys*, from their

[1] *Cebus apella.* The genus *Cebus* has four upper and four lower incisors; two upper and two lower canines; six upper and six lower molars. Superior incisors larger than the inferior; canines more or less strong, those of the males being much more so than the females; head round, muzzle short, forehead a little prominent; occiput projecting behind; facial angle, about sixty degrees; ears rounded; hyoid bone, not projecting; tail prehensile, but entirely covered with hair.

having, like the macaque, that peculiar smell. They belong to the sapajou family, as they have a holding tail; they have only two teats, and bring forth but one or two at a time. They are gentle, docile, and so timorous, that their common cry, which resembles that of the cat, is dwindled down to a kind of sighing, when they are threatened. Their food, in this climate, is principally snails and beetles, which they prefer before any other; but in their native country of Brazil, they chiefly live upon grain, and the wild fruit they pluck from trees, whence they very seldom descend till they have stripped their habitation of its treasure.

THE STRIATED MONKEY, OR OUISTITI[1]

The name of this animal is taken from the sound of its voice. It is not above six inches long, and its tail more than double that length, which is annulated black and white, like the macauco. Its face is naked, and of a flesh color. It has two very singular tufts of long white hair on the fore part of the ears, which, although very large, cannot be seen by looking at the full face of this animal. Mr Edwards says, that, when it is in good health, it has much hair and tufted; that one of those which he saw, and which was healthy, fed on several things, as biscuits, fruit, pulse, insects, snails; and, being one day unchained, he struck at a little gold fish which was in a glass globe, killed it, and devoured it with the greatest avidity; that afterwards, some small eels being put before him, he was frightened when they twisted about his neck, but that he soon conquered and ate them. It is a great enemy to cats. These animals, when young, have an ugly appearance, having scarcely any hair on their bodies. They cling closely to the teats of their dam; and as they grow older, they fix themselves on

[1] *Jacchus vulgaris.* This genus has four upper and four lower incisors; two upper and two lower canines; six upper and six lower molars. Incisors and canines variable in their dimensions. Molars with a crown, furnished with sharp tubercles; head round, muzzle short; occiput prominent; tail longer than the body, soft, and entirely covered with hair; feet pentadactyle; thumb of the anterior hands not opposable; nails very long, compressed, arched, and pointed.

her back or shoulders; when she is weary of carrying them, she releases herself by rubbing against the wall.

The striated monkey is of a hardy nature, and has sometimes produced young ones in Europe, even as far to the north as Paris. Most of the individuals have a somewhat musky smell. The voice is a kind of shrill, hissing whistle.

FAMILY II.—LEMURS.

These animals are characterised by a general form, approaching to the quadruped, properly so called: incisors varying in both jaws, in number, form, and situation. Nostrils at the extremity of the muzzle; posterior extremities longer than the anterior; first finger of the hind feet after the thumb, terminated by a sharp, turned-up nail; two or four pectoral mammæ; tail, when it exists, not prehensile.

THE MACAUCO.[1]

The *macauco*, (which is the ring-tailed lemur of Shaw,) is a beautiful animal, remarkable for the largeness of its eyes, and the length of the hinder legs, which by far exceed those before; by its beautiful and long tail, which is continually elevated and in motion, and upon which are upwards of thirty rings, alternately black and white, all very distinct and separate one from the other. It is gentle; and, although it greatly resembles the monkey in many particulars, it is not so malicious in its nature. It is a gregarious animal, commonly found in company in its natural state; in Madagascar, thirty or forty are seen herding together. It sleeps in a sitting posture, with its snout resting upon its breast; its body is no thicker than that of a cat, but is longer; and it appears larger, as the legs of the animal are very long. The hair is soft, and stands upright.

[1] *Lemur catta.* The genus *Lemur* is characterized by four upper and six under incisors. One canine on each side, in both jaws; molars five above and four below, on each side. Superior incisors, united in pairs, inferior, inclined, long. Superior canines, long, compressed, crossing the inferior ones before; inferior canines, or first molars, compressed, triangular; molars with blunt, tuberculous crowns; two pectoral mammæ; head, long and triangular; muzzle slender; ears short and rounded; fourth toe of the feet largest; tail longer than the body, covered with hair, not prehensile; hair soft and woolly.

THE MONGOOS.[1]

The *mongoos* is less than the macauco; but its hair is, like that, of a short and silken nature, but a little curled; the nose is also thicker. Buffon had a mongoos in his possession for several years; its coat was of a brown color, the eyes yellow, the nose black, and the ears short. It had a custom of playing with and biting its tail, and had, by this method, lessened it by four or five of the last vertebræ. Whenever it got loose, it visited the shops in the neighborhood, and would make free with fruit, sugar, sweetmeats, &c.; to obtain which it would open the boxes. At such times, it was difficult to retake it; and it would bite those that attempted it, even its keeper.

THE RED AND BLACK LEMUR.[2]

This is not only one of the most beautiful of the group to which it

[1] *Lemur mongooz.* [2] *Lemur ruber.*

belongs, but it also possesses the additional recommendation of being unquestionably the rarest known species. Very little was known of it till a living individual was brought to Europe, and figured by M. Cuvier, in his splendid work. A specimen in the collection at Exeter 'Change has since been noticed by Mr Griffith.

The color of this animal is of a bright rufous brown above, and that of the under parts a deep black. The tail is perfectly black. The hair of the upper parts and tail is extremely long, soft, and woolly. The eyes are lively and expressive. From the nose to the root of the tail, it measures about sixteen inches, and the tail itself is still longer.

THE SLOW LEMUR, OR BENGAL LORIS.[1]

This animal is so sluggish in its motions, that some have been erroneously induced to consider it as a sloth. It is about the size of a small cat, and has a flattish face, a nose rather sharp, and extremely prominent eyes; it is of a pale brown or mouse color; round the eyes is a circle of dark brown, and along the middle of the back runs a stripe of the same color. During the greatest part of the day it sleeps, or at least lies without motion.

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[1] *Nycticebus Bengalensis*, Geoff. *Lemur tardigrada*, Lin. The genus *Nycticebus* has two or four upper, and six lower incisors; two upper and two lower canines; twelve upper and ten lower molars. Intermediate incisors separate; lateral, small or none; anterior molars with one point; those at the bottom with a large crown, hollow in the centre, and tubercles at the angles; body thick; members robust; head round; muzzle short, not turned up; eyes very large, approaching, and directed forward; ears short and hairy; two pectoral mammæ; a very short tail; bones of the leg and arm distinct; tibia longer than the femur; tarsus and metatarsus of equal length. Inhabits Bengal, Ceylon, and Java

One of these animals is described by the late Sir William Jones, in the fourth volume of the Asiatic Researches. "In his manners," says he, "he was for the most part gentle, except in the cold season, when his temper seems wholly changed; and his Creator who made him so sensible of cold, to which he must often have been exposed, even in his native forests, gave him, probably for that reason, his thick fur; which we rarely see on animals in these tropical climates. To me, who not only constantly fed him, but bathed him twice a week in water accommodated to the seasons, and whom he clearly distinguished from others, he was at all times grateful, but when I disturbed him in winter, he was usually indignant, and seemed to reproach me with the uneasiness which he felt, though no possible precautions had been omitted to keep him in a proper degree of warmth. At all times he was pleased at being stroked on the head and throat, and he frequently suffered me to touch his extremely sharp teeth: but his temper was always quick; and when he was unseasonably disturbed, he expressed a little resentment, by an obscure murmur, like that of a squirrel; or a greater degree of displeasure by a peevish cry, especially in winter, when he was often as fierce, on being much importuned, as any beast of the woods.

"From half an hour after sunrise to half an hour before sunset, he slept without intermission, rolled up like a hedgehog; and, as soon as he awoke, he began to prepare himself for the labors of *his* approaching day, licking and dressing himself like a cat; an operation which the flexibility of his neck and limbs enabled him to perform very completely: he was then ready for a slight breakfast, after which he commonly took a short nap; but when the sun was quite set, he recovered all his vivacity.

"His ordinary food was the sweet fruit of this country; plantains always, and mangoes during the season; but he refused peaches, and was not fond of mulberries, or even of guiavas: milk he lapped eagerly, but was content with plain water. In general, he was not voracious, but he never appeared satiated with grasshoppers; and passed the whole night, while the hot season lasted, in prowling for them. When a grasshopper, or any insect, alighted within his reach, his eyes, which he fixed on his prey, glowed with uncommon fire; and having drawn himself back, to spring on it with greater force, he seized the prey with both his fore paws, but held it in one of them while he devoured it. For other purposes, and sometimes even for that of holding his food, he used all his paws indifferently as hands, and frequently grasped with one of them the higher parts of his ample cage, while his three others were severally engaged at the bottom of it; but the posture of which he seemed fondest, was to cling with all four of them to the wires, his body being inverted. In the evening, he usually stood erect for many minutes, playing on the wires with his fingers, and rapidly moving his body from side to side, as if he had found the utility of exercise in his unnatural state of confinement.

"A little before day-break, when my early hours gave me frequent opportun ties of observing him, he seemed to solicit my attention; and if I presented my finger to him, he licked or nibbled it with great gentleness, but eagerly took fruit when I offered it, though he seldom ate much at his morning repast: when the *day brought back his night*, his eyes lost their lustre and strength, and he composed himself for a slumber of ten or eleven hours.

"My little friend was, on the whole, very engaging; and when he was found lifeless, in the same posture in which he would naturally have slept, I consoled myself with believing that he died without much pain, and lived with as much pleasure as he could have enjoyed in a state of captivity."

ORDER THIRD—CHEIROPTERA.

These animals are in their general form disposed for flight. Their incisors are variable in number; canines more or less strong; molars sometimes covered with points, sometimes furrowed longitudinally; a fold of skin between the four members and the fingers of the anterior feet; two pectoral mammæ; very strong clavicles; scapulæ large: fore arms not capable of rotation.

THE BAT.

An animal, which, like the bat, is half quadruped and half bird, and which, in fact, is neither the one nor the other, is a kind of monster. In the bat, the fore feet are, properly speaking, neither wings nor feet, though the animal uses them for the purpose of flying, and occasionally of moving along upon the ground. They are, in fact, two shapeless extremities, of which the bones are of a monstrous length, and connected by a membrane, not covered with feathers, or even with hair, like the rest of the body: they are a kind of winged paws, or hands, ten times larger than the feet, and in all, four times longer than the whole length of the body of the animal: they are, in a word, parts which have rather the appearance of a capricious and accidental, than a regular and determined production.

To these incongruities, these disproportions of the body and members, may be added the still more striking deformities of the head. In some species, the nose is hardly visible, the eyes are sunk near the tip of the ear, and are confounded with the cheeks; in others, the ears are as long as the body, or else the face is twisted into the form of a horse-shoe, and the nose covered with a kind of crust. Averse, likewise, to the society of all other creatures, they shun the light, inhabit none but dark and gloomy places, to which, after their nocturnal excursions, they are sure to return by break of day, and in which they remain, fixed, as it were, to the walls, till night again approaches

Their motion in the air is with less propriety to be termed a flight, than a kind of uncertain flutter, which they seem to execute by struggles, and in an awkward manner. They raise themselves from the ground with difficulty, never soar to a great height, and are but imperfectly qualified to accelerate, or even to direct, their flight. This, far from being either rapid or very direct, is performed by hasty vibrations in an oblique and winding direction; and in passing along they do not fail to seize all the gnats, moths, and other nocturnal insects that come in their way. These they swallow entire; and in their excrements we meet with the remains of wings and the other dry parts, which they have not been able to digest. Like quadrupeds, the bat brings forth its young alive, and like them it has teeth and nipples.

From the observations of Spallanzani, it appears that many of the bats possess an additional sense, by which, when deprived of seeing, they are enabled to avoid any obstacles that may be in the way of their flight.

It is affirmed that these animals do not produce more than two at a birth, and that these they suckle, and even carry along with them as they fly. They unite in numbers to defend each other from the cold; they pass the winter without awaking, without stirring, and without eating, from the end of autumn till spring. Though they can more easily support hunger than cold, and can even subsist a number of days without food, they yet belong to the number of carnivorous animals; for, when opportunity serves, they will devour bacon, and meat of all kinds, whether raw or roasted, whether fresh or corrupted.

VAMPIRE BATS.

THE ROUSSETTE,[1] THE ROUGETTE,[2] AND THE SPECTRE BAT.[3]

The roussette and the rougette seem to form two distinct species, which, however, are so full of resemblances to each other, that they ought not to be presented asunder. The latter differs from the former solely in the size

[1] *Pteropus vulgaris*, Geoff. The genus *Pteropus* has four upper and four lower incisors; two upper and two lower canines; ten upper and twelve lower molars. Molars with the crown truncated obliquely, and marked with a longitudinal furrow; head, long and conical; ears short, simple, with auricles; no crest or nasal appendage; tail short, or none; interfemoral membrane sloped off. An additional phalanx and nail on the index finger of the wings; tongue papillous.

[2] *Pteropus stramineus*, Geoff.

[3] *Phyllostoma spectrum*, Lin. The genus *Phyllostoma* has four upper and four lower incisors; two upper and two lower canines; ten upper and ten or twelve lower molars. Lateral incisors very small, the intermediate ones broader; head, long and conical; nose with two nasal crests, one like a leaf, the other of a horse-shoe form; ears large, naked, not united. Auricle internal, dentated; eyes small and lateral; tongue rough with horny papillæ; tail and interfemoral membrane more or less developed.

of the body and the colors of the hair. The roussette, whose hair is of a reddish brown, is in length nine inches from the tip of the nose to the insertion of the tail, and in breadth three or even four feet, when the membranes, which serve it for wings, are fully extended. The rougette, whose hair is of a reddish ash-color, is hardly more than five inches and a half in length, and two feet in breadth; and its neck is half encircled with a stripe of hair of a lively red, intermixed with orange color, of which we perceive no vestige on the neck of the roussette. They both belong nearly to the same hot climates of the old continent. We meet with them in Madagascar, in the island of Bourbon, in Ternate, in the Philippine and other islands of the Indian Archipelago, where, indeed, they seem to be more common than in the neighboring continents.

The smell of these creatures is ranker than that of a fox, yet the Indians consider them as delicious food, and the French who reside in the Isle of Bourbon, even boil them in their soup to give it a relish! The hair of the vampire bat, interwoven with threads of cyperus squamosus, is used by the natives of New Caledonia for making ropes and the tassels of their clubs.

In the hotter countries of the New World, and in some of the islands of the Pacific Ocean, we likewise meet with another flying quadruped, of which we know not the American name, but to which we will affix the denomination of *spectre*, because it sucks the blood of men, and of animals, while they are asleep, without causing even sufficient pain to awake them.

The spectre is smaller than the rougette, which is itself smaller than the roussette. The former, when it flies, seems to be of the size of a pigeon; the second, of the size of a raven; and the third, of the size of a large hen. Of both, the roussette and the rougette, the head is tolerably well shaped; the ears are short, and the nose is very round, and nearly in form like that of a dog. Of the spectre, on the contrary, the nose is more elongated; the aspect is as hideous as that of the ugliest bats; the head is unshapely, and the ears large, very open, and very straight; its nose is disfigured; its nostrils resemble a funnel, and have a membrane at the top, which rises up in the form of a sharp horn, or cock's comb, and greatly heightens the deformity of its face.

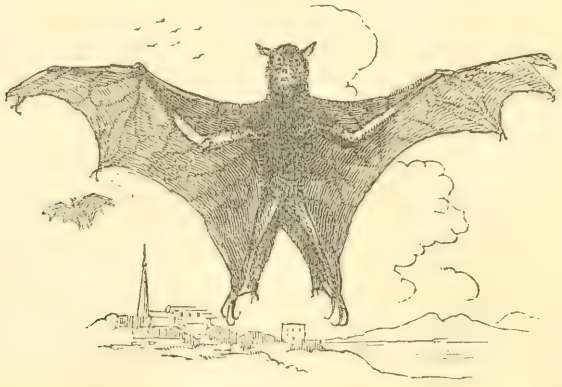
There is no doubt, therefore, but that the species of the spectre is different from those of the roussette and the rougette. It is an animal not less mischievous than it is deformed; it is the pest of man, the torment and destruction of animals. In confirmation of this truth, a more authentic testimony cannot be produced than that of M. de la Condamine. "The bats," says he, "which suck the blood of horses, of mules, and even of men, when they do not guard against it by sleeping under the shelter of a pavilion, are a scourge common to most of the hot countries of America. Of these there are some of a monstrous size. At Borja, and several other places, they have entirely

destroyed the large cattle which the missionaries had brought thither, and which had begun to multiply."

The roussette and rougette are larger, stronger, and perhaps yet more mischievous than the spectre; but it is by open force, and in the day as well as in the night, that they commit hostilities. Fowls and small animals are the objects of their destructive fury; they even attack men, and bite their faces most cruelly.

All these bats are animals carnivorous, voracious, and possessed of an appetite for every thing that offers. In a dearth of flesh or fish, they feed on vegetables and fruits of every kind. As they are fond of the juice of the palm tree, so it is easy to take them by placing in the neighborhood of their retreat a few vessels filled with palm tree water, or any other fermented liquor, with which they intoxicate themselves. They fasten to, and suspend themselves from trees, with their claws. They are usually seen in troops, and more so by night than by day; places which are much frequented they shun; and their favorite residence is in the deserted parts of islands.

I have frequently thought it worth while to examine how it is possible that these animals should suck the blood of a person asleep, without causing, at the same time, a pain so sensible as to awake him. Where they cut the flesh with their teeth or with their claws, the pain of the bite would effectually rouse any of the human species, however soundly asleep. With their tongue only, then, it is possible for them to make such minute apertures in the skin, as to imbibe the blood through them, and to open the veins without causing an acute pain.



The tongue of the spectre I have not had an opportunity to observe; but that of several roussettes, which Mr Daubenton has attentively examined, seems to indicate the possibility of the fact. It is sharp, and full of prickles directed backward; and it appears that these prickles, or points, from their exceeding minuteness, may be insinuated into the pores of the skin, may

enlarge them, and may penetrate them so deep, as to command a flow of blood by the continual suction of the tongue. But we can only conjecture upon a fact of which all the circumstances are imperfectly known to us, and of which some are perhaps exaggerated, or erroneously related, by the writers who have transmitted them to us.

Captain Stedman, while sleeping in the open air in Surinam, was attacked by one of the spectre bats. On awaking, about four o'clock in the morning, he was extremely alarmed to find himself weltering in congealed blood, and without feeling any pain. Having started up, he ran to the surgeon with a firebrand in his hand, and all over besmeared with gore. The cause of his alarm was, however, soon explained. After he had applied some tobacco ashes to the wound, and had washed the gore from himself and his hammock, he examined the place where he had lain, and observed several small heaps of congealed blood upon the ground; on examining which, the surgeon judged that he had lost at least twelve or fourteen ounces. Captain Stedman says, that these animals, knowing by instinct that the person they intend to attack is in a sound slumber, they generally alight near the feet; where, while the creature continues fanning with his enormous wings, which keeps the person cool, he bites a piece out of the tip of the great toe, so very small that the head of a pin could scarcely be received into the wound, which is consequently not painful. Yet, through this orifice, he sucks the blood until he is obliged to disgorge. He then begins again, and thus continues sucking and disgorging till he is scarcely able to fly; and the sufferer has often been known to sleep from time into eternity. The spectre bat generally bites in the ear, but always in places where the blood will flow spontaneously.

The following extract is from Waterton:

"We will now take a view of the vampire. As there was a free entrance and exit to the vampire in the loft, where I slept, I had a fine opportunity of paying attention to this nocturnal surgeon. He does not always live on blood. When the moon shone bright, and the fruit of the banana tree was ripe, I could see him approach and eat it. He would also bring into the loft from the forest, a green round fruit, about the size of a nutmeg. There was something also in the blossom of the sawarri nut-tree that was grateful to him; for on coming up Waratilla creek in a moonlight night, I saw several vampires fluttering round the sawarri tree, and every now and then the blossoms, which they had broken off, fell into the water. So I concluded that the vampires pulled them from the tree, either to get at the incipient fruit, or to catch the insects which often take up their abode in flowers.

"The vampire, in general, measures about twenty-six inches from wing to wing extended, though I killed one which measured thirty-two inches. He frequents old houses and hollow trees; and sometimes a cluster of them may be seen in the forest, hanging head downwards from the branch of a tree.

"The vampire has a curious membrane, which rises from the nose, and gives it a singular appearance. There are two species of vampire in Guiana, a larger and a smaller. The larger sucks men and other animals; the smaller seems to confine himself chiefly to birds. I learnt from a gentleman high up on the river Demerara, that he was completely unsuccessful with his fowls on account of the small vampire. He showed me some that had been sucked the night before, and they were scarcely able to walk.

"Some years ago, I went to the river Paumaron with a Scotch gentleman, by name Tarbet. We hung our hammocks in the thatched loft of a planter's house. Next morning, I heard this gentleman muttering in his hammock, and now and then letting fall an imprecation, just about the time he ought to have been saying his morning prayers. 'What is the matter, Sir,' said I softly; 'is any thing amiss?' 'What's the matter?' answered he sullenly; 'why the vampires have been sucking me to death.' As soon as there was light enough, I went to his hammock, and saw that it was much stained with blood. 'There,' said he, thrusting his foot out of the hammock, 'see how these infernal imps have been drawing my life's blood!' On examining his foot, I found the vampire had tapped his great toe: there was a wound somewhat less than that made by a leech; the blood was still oozing from it: I conjectured he might have lost from ten to twelve ounces of blood. Whilst examining it, I think I put him in a worse humor by remarking, that an European surgeon would not have been so generous as to have blooded him without making a charge. He looked up in my face, but did not say a word; and I saw he was of opinion that I had better have spared this piece of ill-timed levity."

Of American bats there are five kinds noticed by Godman, viz: the Carolina, hoary, cuneated, subulate, and New York bats.

ORDER FOURTH—FERÆ.

This order embraces animals with four extremities proper for walking; three kinds of teeth: mammæ abdominal, varying in number, stomach simple, membranous, intestines short.

FAMILY I.—INSECTIVORÆ.

These have the feet flat, armed with stout nails; those of the hind feet always with five toes, having their sole entirely bearing upon the ground, fore feet generally with five toes; molar teeth crowned with pointed tubercles; canines sometimes very long, sometimes very short; incisors variable in number; body covered with hair or prickles.

THE HEDGEHOG.[1]

This animal varies in length from six to ten inches; and has the power of defending itself from an enemy without combating him, and of annoying without attacking him. Possessed of little strength, and of no agility by which it might escape its foes, it has received from nature a prickly armor, with a faculty of rolling itself up into a ball, and of presenting from every part of its body a poignant weapon of defence. Even from its fear this animal obtains another engine of security; the smell of its urine, which, when attacked, it generally sheds, being sufficient to disgust its enemy with the contest, and to keep him at a distance. Thus, the generality of dogs are content with barking at the hedgehog, when it falls in their way, without discovering any inclination to seize it. Of these, however, there are some, which, like the fox, have had the address to master it, though of the marten, the polecat, the ferret, the weasel, or any of the birds of prey, it has no dread.

When at large in the country, they are generally found in woods, under the trunks of old trees, as also in the clefts of rocks. It is not probable that they climb up trees, as some naturalists have affirmed, or that they make use of their prickles to carry off the fruit; it is with their mouth they seize it. They always remain at the foot, in some hollow space, or under moss. They remain in a state of inactivity all day; they only venture abroad by night, and seldom approach human habitations. They sleep during the winter; and therefore every thing that has been said of their laying up provisions for that season, must be false. They at no time eat much, and can subsist very long without any food whatever. Hedgehogs are occasionally eaten, and their flesh is said to be delicate food; their skin is not now converted to any use, though the ancients used it for the purpose of a clothes brush.

The hedgehog may be rendered domestic, and in that state is very useful in destroying cockroaches and beetles, which he pursues and devours with great activity. He is believed also to destroy mice, nearly if not quite as well as a cat. A hedgehog belonging to the proprietor of an inn at Felton, in Northumberland, Eng., was taught to perform perfectly the duty of a turnspit dog. It ran familiarly round the house, and was very obedient.

"In the month of June, 1782," says a correspondent in the Gentleman's Magazine, "a full grown hedgehog was put into a small yard, in which was a border of shrubs and annuals. In the course of a few days he formed, beneath a small holly tree, a hole in the earth sufficiently large to receive

[1] *Erinaceus Europæus*, Lin. The genus *Erinaceus* has six upper and six lower incisors; two upper and two lower canines; ten upper and eight lower molars; intermediate upper incisors separate, cylindrical; canines smaller than the molars; body thick, covered with prickles above and stiff hairs below, capable of rolling up into a ball; muzzle pointed; ears medium size, or very short and rounded; toes armed with strong nails; tail short or none; ten mammæ, six pectoral, and four ventral; no cœcum; clavicles complete.

his body. After a while a small shed was built for him in the corner of the yard, and filled with straw; but the animal would not quit its former situation until it was covered with a stone. He then took possession of the shed, and every morning carried leaves from a distant part of the border, to stop its mouth. His principal food was raw meat and mice. Of the latter, he would eat six at a time, but never more; and although these were thrown to him dead, he bit them all in the neck before he began to eat any. He would also eat snails with their shells; but would leave any thing for milk, which he lapped exceedingly slow. To this, even if set six or eight yards distant from his shed, he would almost always come out half an hour before his usual time. If the person who usually fed him neglected to do so, he would follow him along the yard; and if the door was open he would go into the house. If meat was put near the mouth of his shed in the day time, he would sometimes pull it in and eat it. As the weather became colder, he carried more leaves into his shed; and sometimes he would not come out for two or three days successively. About the end of November he died; from want of food, as was supposed, but most probably from the severity of the weather."

THE SHREW MOUSE[1]

Is smaller than the domestic mouse: it has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the shrew mouse, yet they will not eat its flesh, like that of the domestic mouse. It is evidently this noisome odor, this aversion of the cat to it, that gave rise to the notion, that the shrew mouse is a venomous animal, and that its bite is so dangerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the shrew mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter, especially, the shrew mouse generally fixes its residence in some hay-loft, stable, or barn, where it feeds on grain, insects, and putrified

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[1] *Sorex araneus*, Lin. The genus *Sorex* has two upper and two lower incisors; six or eight upper and four lower spurious canines, or lateral incisors; eight upper and six lower true molars; upper middle incisors hooked and dentated at base; molars crowned with points; head much elongated; nose prolonged and moveable; ears short, rounded; eyes small, but perceptible; tail more or less long, often angular; feet with weak toes, separated, furnished with crooked nails; teats six or eight; sebaceous glands on the sides.

flesh. It is likewise found in the woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The shrew mouse produces, it is said, as many at a birth as the domestic mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as it both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual color of the shrew is brown, with a mixture of red; others of them are ash-colored; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; and in America there are several species of a small size. Among them are the small shrew, and the short-tailed shrew. The first is found on the Missouri, and the latter on the Rocky Mountains. Godman mentions a third species, and Richardson notices two others, the American marsh shrew, and Foster's shrew mouse.

THE MOLE,[1]

Without being blind, has such small eyes, and these so concealed, that it was formerly supposed to be able to make but little use of the sense of seeing; but it is now known that its eyes possess all the qualities necessary to distinct vision. It enjoys also the senses of hearing and feeling in an eminent degree. Its skin is soft as silk; and its paws, which are furnished with five claws, are very different from those of other animals, and almost like the hands of a human being. Proportioned to the size of its body, its strength is great; it possesses the mild habitudes of repose and of solitude; the art of securing itself, of forming, instantaneously, as it were, an asylum for itself; or extending it, and of obtaining, without the necessity of relinquishing it, an abundant subsistence.

The mole shuts up the entry to its retreat, which it seldom deserts, unless forced to it by heavy rains in summer. It is fond of cultivated grounds, and is never to be found in those which are either muddy, hard, compact, or stony. It requires a soft soil, well supplied with esculent roots, and with insects and worms, of which, indeed, its principal nourishment consists.

[1] *Talpa Europea*, Lin. The genus *Talpa* has six upper and eight lower incisors; two upper and two lower canines; fourteen upper and twelve lower molars. Body thick; head elongated, pointed; muzzle with a cartilaginous button; eyes very small; no external ears; pentadactylous; fore feet very large, with toes united to the nails, which are strong and slightly arched.

In skinning the larvæ of insects, which it always does before it eats them, it displays much expertness; stripping off the skin from end to end, and squeezing out the contents of the body.

As these animals very seldom come above ground, they have but few enemies; and very readily evade the pursuit of animals swifter and stronger than themselves. The chief calamity which befals them is an inundation; and when this happens, they are seen in numbers attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greater part, however, perish, as well as the young, which remain behind in their holes. Were it not for such accidents, from their great fecundity, they would become extremely troublesome. They generally have four or five at a time; and it is easy to distinguish, among other mole hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually larger and more elevated. It is probable they produce oftener than once a year. Thus far, indeed, is certain, that new-born moles are found from the month of April to the month of August; a circumstance which, however, may be owing to their having been engendered and brought forth sooner or later in the year.

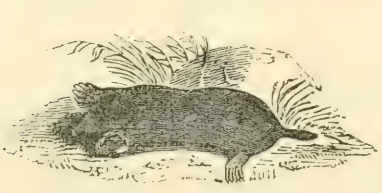
The hole in which they produce their young is formed with singular skill, and deserves a particular description. The female begins by erecting the earth into a tolerably spacious apartment, which is supported within by partitions at proper distance, to keep the roof from falling. All around this she works, and beats the earth very firm, so as to make it capable of keeping out the rain, let it be never so violent. As the hillock, in which the apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and therefore less subject to accidental slight inundations. The place being thus fitted, she procures grass and dry leaves as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally free from danger; for all round this hill of her own raising, are holes running into the earth, which go off from the middle apartment, like rays from a centre, and extend about fifteen feet in every direction. These resemble so many walks or chases, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide; but they contribute still more to the general safety; for as the mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make good a retreat.

Moles live in pairs, between which a warm attachment subsists. They are, however, said to be ferocious, and occasionally to tear and eat each other.

Some authors have said, but without foundation, that the mole and the badger sleep the whole winter. As a proof that the latter quits its hole in

winter as well as in summer, we have only to view the traces it leaves upon the snow. As for the mole, so far is it from sleeping during the winter, that it continues its subterranean operations then as well as in summer; and the peasants of France even proverbially remark, that, "when moles are at work, a thaw is at hand." They are indeed fond of warm places; and the gardeners often catch them round their beds, in the months of December, January, and February. In pasture lands, and in nurseries of forest trees, they do considerable mischief. In 1740, M. Buffon planted sixteen acres with acorns, the greater part of which were speedily carried away by the moles. Not less than a bushel of acorns was found in some of their burrows. The common mole of Europe is supposed not to inhabit America.

THE SHREW MOLE[1].



Is found in abundance in North America, from Canada to Virginia. It lives principally under ground, in which it burrows with great quickness, by means of its strong and broad hands, armed with sharp claws. These burrows are sometimes very deep, and hills of loose earth are generally found over them. Sometimes one of these creatures shows his head from the centre of one of the hills at mid-day, for the purpose of enjoying the sunshine. They form galleries under ground, by which they can travel in any direction. It is said, that they come to the top of the ground daily, at twelve o'clock.

This animal is covered with a soft, glossy fur; its head is destitute of external ears, though its sense of hearing is very acute. The eyes are so small as scarcely to be perceived. It has great strength and speed,

[1] *Scalops Canadensis.* The genus *Scalops* has two incisors above and four below; three conical teeth, and three molars, on each side, in both jaws. Lower incisors conical, straight, with two very small intermediate incisors; first and third upper conical teeth on each side, larger than the second; molars crowned with sharp tubercles; muzzle prolonged and cartilaginous; eyes very small; external ears, none; feet short, pentadactyle, the anterior very broad; nails long, flattened, proper for digging; tail short.

even on the surface of the earth, its movement being the same as when burrowing.

THE GOPHER MOLE, OR CAMAS RAT.

This animal is found on the Columbia and Missouri rivers. It lives beneath the surface of the earth, and eats roots. The head appears large and clumsy, owing to its cheek pouches. The root of the camas plant is its favorite food, from which it derives its name. It is said by Schoolcraft, to employ its pouches in carrying dirt out of its hole, and Richardson adopts this account as true; but an intelligent individual, who has spent much time in the country which it frequents, assures us that he has often seen the gopher at work, and that it brings up the dirt with its broad feet. The quantity that it will throw out in a short space of time, is truly astonishing.

FAMILY II.—CARNIVORA.

These animals have six incisors in each jaw; molars generally edged; sometimes tuberculous, never rough, with pointed tubercles on their crown; canines very strong.

THE BROWN BEAR.[1]

The bear is not only a savage, but a solitary animal; he takes refuge in the most unfrequented parts, and the most dangerous precipices of uninhabited mountains. He chooses his den in the most gloomy parts of the forest, in some cavern that has been hollowed by time, or in the hollow of some enormous old tree. Thither he retires alone, and passes a part of the winter without provisions, or without ever stirring abroad. He is not, however, entirely deprived of sensation, like the dormouse or the marmot, but seems rather to subsist upon the exuberance of his former flesh, and only feels the calls of appetite when the fat he had acquired in summer begins to be considerably wasted.

When this happens, which we are told it generally does at the expiration of forty or fifty days, the male forsakes his den; but the female remains confined for four months, by which time she has brought forth her young.

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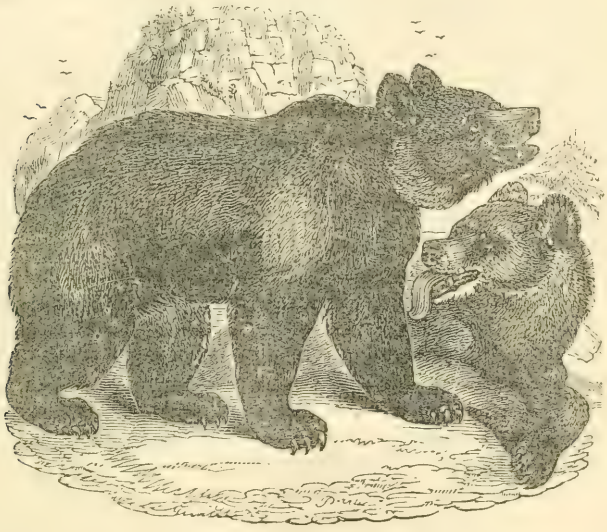
[1] *Ursus arctos.* The genus *Ursus* has six upper and six lower incisors; two upper and two lower canines; four to seven upper, and the same number of lower molars. Incisors of the lower jaw on the same line; posterior molars very strong, with a square crown and blunt tubercles; feet pentadactyle, armed with strong nails; body thick; tail short; mammæ six; two pectoral and four ventral.

That the latter should not only be able to subsist, but even to nurse her offspring, without receiving herself any food for such a length of time, is highly improbable. When with young, however, it is allowed that they are exceedingly fat, as also that, being covered with a very thick coat, sleeping the greater part of their time, and giving themselves no exercise or motion, they must necessarily lose very little by perspiration.

Though the males of the brown species devour their new-born little ones, when they find an opportunity for it, yet the females seem, on the contrary, to love them with a ferocious distraction. When once they have brought forth, their fury is more violent, as well as more dangerous, than that of the males. Before the young leave the womb, their formation is perfect: and if the fœtus of the bear appears at the first glance unformed, it is merely because there is a want of proportion in the body and members even of the grown bear, and because, which is well known to be the case in all animals, the fœtus, or the new-born animal, is always more disproportioned than the grown animal.



The voice of the bear is a kind of growl, a harsh murmur, which, when enraged especially, is heightened by a clashing of the teeth. Highly susceptible of anger, that anger is always furious, and often capricious. However mild he may appear before his master, and even obedient when tamed, he ought still to be distrusted, still treated with circumspection; nor, on any account, must he be struck on the tip of the nose, or touched on the parts of generation.

This animal is capable of some degree of instruction. There are few who have not seen him stand on his hind legs, or with these dance in rude and awkward measure, to tunes either sung or played on an instrument. But, even in thus tutoring him, it is necessary, in order to succeed, that the animal should be taken young, and be held in constraint ever after. The bear which has passed his youth, is not to be tamed, nor even held in awe, and shows himself, if not actively intrepid, at least fearless of danger.

The wild bear turns not from his path, nor offers to shun the sight of man; and yet, it is said, by a certain whistle he may be surprised, and so far charmed as to stop, and stand upon his hind feet. This is the time to shoot, or by one method or other to destroy him; for, when only wounded in an attack, he darts with fury at his foe, and, clasping him with his fore paws, is sure to stifle or strangle him, unless immediate assistance be given.

The bear enjoys the senses of seeing, hearing, and feeling, in great perfection; and yet, compared with the size of his body, his eye is very small; his ears are also short; his skin is coarse; and his hair very thick. His smell is exquisite; more so, perhaps, than that of any other animal, the internal surface of his nose being very extensive, and excellently calculated to receive the impression of odors. He strikes with his paws as a man strikes with his fists; but in whatever particulars he may bear a rude kind of resemblance to the human species, he is only rendered the more deformed by them; nor do they give him the smallest superiority over other animals.

In no part of the world, perhaps, are bears more numerous than at Kamstchatka, and no where are they so gentle. They rove about the plains in large droves, yet they never disturb the women and girls, who gather roots and herbs, or turf for fuel, in the very midst of them; nay, they will even eat out of their hands. Their mildness, however, does not preserve them from being persecuted by mankind. For this ingratitude man has, indeed, some excuse in the great utility of the spoils of the bear. The Kamstchadale would find it much more difficult to subsist, did not the bear supply him with many necessary articles. Beds, coverlets, caps, gloves, shoe-soles, and collars for sledge dogs, are made of the skin; the fat is savory and nutritious as food, and when melted is used as oil; the flesh is highly esteemed; the shoulder blades are converted into sickles for cutting grass the intestines, when prepared, are worn by the women as masks, to protect the face from the sun, and are also converted into excellent panes for windows; and the heads and haunches are hung on trees, around the dwellings, as ornaments, or as trophies. To the bear the Kamstchadale is likewise indebted for his scanty knowledge of physic and surgery, which he acquires by noticing what herbs the animal applies to his wounds, or eats when he is laboring under disease; and to the bear, too, he owes all his ideas of

dancing; his bear dance, as he calls it, being nothing more than a close imitation of his shaggy quadruped instructors.

The brown bear is upwards of four feet long. He inhabits Europe and the temperate parts of Asia.

THE GRIZZLY BEAR.[1]

This animal inhabits the northern part of America, and is, perhaps, the most formidable of all bears in magnitude and ferocity. He averages twice the bulk of the black bear, to which, however, he bears some resemblance in his slightly elevated forehead, and narrow, flattened, elongated muzzle. His canine teeth are of great size and power. The feet are enormously large; the breadth of the fore foot exceeding nine inches, and the length of the hind foot, exclusive of the talons, being eleven inches and three quarters, and its breadth seven inches. The talons sometimes measure more than six inches. He is, accordingly, admirably adapted for digging up the ground, but is unable to climb trees, in which latter respect he differs wholly from every other species. The color of his hair varies to almost an indefinite extent, between all the intermediate shades of a light gray and a black brown; the latter tinge, however, being that which predominates. It is always in some degree grizzled, by intermixture of grayish hairs, only the brown hairs being tipped with gray. The hair itself is, in general, longer, finer, and more exuberant than that of the black bear.

The neighborhood of the Rocky Mountains is one of the principal haunts of this animal. There, amidst wooded plains, and tangled copses of bough and underwood, he reigns as much the monarch, as the lion is of the sandy wastes of Africa. Even the bison cannot withstand his attack. Such is his muscular strength, that he will drag the ponderous carcass of the animal to a convenient spot, where he digs a pit for its reception. The Indians

[1] *Ursus ferox*, Lewis & Clarke.

regard him with the utmost terror. His extreme tenacity of life renders him still more dangerous; for he can endure repeated wounds which would be instantaneously mortal to other beasts, and, in that state, can rapidly pursue his enemy. So that the hunter who fails to shoot him through the brain, is placed in a most perilous situation.

One evening the men in the hindmost of one of Lewis and Clark's canoes perceived one of these bears lying in the open ground about three hundred paces from the river; and six of them, who were all good hunters, went to attack him. Concealing themselves by a small eminence, they were able to approach within forty paces unperceived; four of the hunters now fired, and each lodged a ball in his body, two of which passed directly through the lungs. The bear sprang up and ran furiously with open mouth upon them; two of the hunters, who had reserved their fire, gave him two additional wounds, and one breaking his shoulder-blade, somewhat retarded his motions. Before they could again load their guns, he came so close on them, that they were obliged to run towards the river, and before they had gained it the bear had almost overtaken them. Two men jumped into the canoe; the other four separated, and concealing themselves among the willows, fired as fast as they could load their pieces. Several times the bear was struck, but each shot seemed only to direct his fury towards the hunter; at last, he pursued them so closely that they threw aside their guns and pouches, and jumped from a perpendicular bank, twenty feet high, into the river. The bear sprang after them, and was very near the hindmost man, when one of the hunters on the shore shot him through the head and finally killed him. When they dragged him on shore, they found that eight balls had passed through his body in different directions.

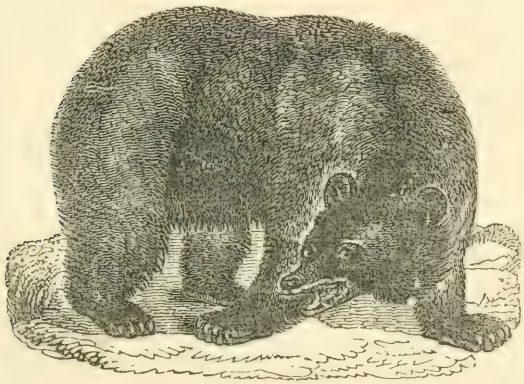
On another occasion, the same enterprising travellers met with the largest bear of this species they had ever seen; when they fired he did not attempt to attack, but fled with a tremendous roar, and such was his tenacity of life, that although five balls had passed through the lungs, and five other wounds were inflicted, he swam more than half across the river to a sand bar, and survived more than twenty minutes.

Mr John Dougherty, a very experienced and respectable hunter, who accompanied Major Long's party during their expedition to the Rocky Mountains, several times very narrowly escaped from the grizzly bear. Once while hunting with another person on one of the upper tributaries to the Missouri, he heard the report of his companion's rifle, and when he looked round, beheld him at a short distance endeavoring to escape from one of these bears, which he had wounded as it was coming towards him. Dougherty, forgetful of every thing but the preservation of his friend, hastened to call off the attention of the bear, and arrived in rifle-shot distance just in time to effect his generous purpose. He discharged his ball at the animal, and was obliged in his turn to fly; his friend, relieved from immediate danger, prepared for another attack by charging his rifle, with which he

again wounded the bear, and saved Mr D. from further peril. Neither received any injury from this encounter, in which the bear was at length killed.

Mr Dougherty, the hunter before mentioned, relates the following instance of the great muscular strength of the grizzly bear:—Having killed a bison, and left the carcass for the purpose of procuring assistance to skin and cut it up, he was very much surprised on his return to find that it had been dragged off, whole, to a considerable distance, by a grizzly bear, and had been placed in a pit, which the animal had dug with his claws for its reception.

THE AMERICAN BLACK BEAR.[1]



This animal is found in considerable numbers, in the northern districts of America. In size and form he approaches nearest to the brown bear; but his color is a uniform shining jet black, except on the muzzle, where it is fawn colored; on the lips and sides of the mouth it is almost gray. The hair, except on the muzzle, is long and straight, and is less shaggy than in most other species. The forehead has a slight elevation, and the muzzle is elongated, and somewhat flattened above. The young ones, however, are first of a bright ash color, which gradually changes into a deep brown, and ends by becoming a deep black.

The American black bear lives a solitary life in forests and uncultivated deserts, and subsists on fruits, and on the young shoots and roots of vegetables. Of honey he is exceedingly fond, and, as he is a most expert climber, he scales the loftiest trees in search of it. Fish, too, he delights in, and is often found in quest of them on the borders of lakes and on the sea-shore.

[1] *Ursus Americanus*, Desm.

When these resources fail, he will attack small quadrupeds, and even animals of some magnitude. As, indeed, is usual in such cases, the love of flesh in him grows with the use of it.

As the fur is of some value, the Indians are assiduous in the chase of the creature which produces it. "About the end of December, from the abundance of fruits they find in Louisiana and the neighboring countries, the bears become so fat and lazy that they can scarcely run. At this time they are hunted by the American Indians. The nature of the chase is generally this: the bear chiefly adopts for his retreat the hollow trunk of an old cypress tree, which he climbs, and then descends into the cavity from above. The hunter, whose business it is to watch him into his retreat climbs a neighboring tree, and seats himself opposite to the hole. In one hand he holds his gun, and in the other a torch, which he darts into the cavity. Frantic with rage and terror, the bear makes a spring from his station; but the hunter seizes the instant of his appearance, and shoots him.

"The pursuit of these animals is a matter of the first importance to some of the Indian tribes, and is never undertaken without much ceremony. A principal warrior gives a general invitation to all the hunters. This is followed by a strict fast of eight days, in which they totally abstain from food; but during which the day is passed in continual song. This is done to invoke the spirits of the woods to direct the hunters to the places where there are abundance of bears. They even cut the flesh in divers parts of their bodies, to render the spirits more propitious. They also address themselves to the spirits of the beasts slain in preceding chases, and implore these to direct them in their dreams to an abundance of game. The chief of the hunt now gives a great feast, at which no one dares to appear without first bathing. At this entertainment, contrary to their usual custom, they eat with great moderation. The master of the feast touches nothing; but is employed in relating to the guests ancient tales of feats in former chases; and fresh invocations to the spirits of the deceased bears conclude the whole.

"They then sally forth, equipped as if for war, and painted black; and they proceed on their way in a direct line, not allowing rivers, marshes, or any other impediment, to stop their course, and driving before them all the beasts they find. When they arrive at the hunting ground, they surround as large a space as they can; and then contract their circle, searching at the same time every hollow tree, and every place capable of being the retreat of a bear; and they continue the same practice till the chase is expired.

"As soon as a bear is killed, a hunter puts into his mouth a lighted pipe of tobacco, and blowing into it, fills the throat with the smoke, conjuring the spirit of the animal not to resent what they are about to do to its body, or to render their future chases unsuccessful. As the beast makes no reply, they cut out the string of the tongue, and throw it into the fire. If it crackle and shrivel up (which it is almost sure to do,) they accept this as

a good omen; if not, they consider that the spirit of the beast is not appeased, and that the chase of the next year will be unfortunate."

In the Tower Menagerie of London, there is a very tame and playful American bear, which was presented to it in 1824. He was originally in the same den with the hyæna, and, except at feeding times, was on good terms with his companion. A piece of meat, however, would occasionally produce a temporary dissension between them; in which the hyæna, though the smallest of the two, had usually the upper hand. On such occasions, the defeated bear would moan most piteously, in a tone somewhat like a sheep bleating, while the hyæna devoured the remainder of his dinner.*

THE WHITE, OR POLAR BEAR.[1]

The polar bear is distinguished by his tremendous ferocity. It sometimes reaches the length of twelve feet. Its head and neck are more

*When our forefathers first settled in America, bears were common in all parts of the country along the Atlantic. Many adventures with them took place, some of which are recorded in the histories of the times. The following is said to have occurred at a later period:

Some years since, when the western part of New-York was in a state of nature, and wolves and bears were not afraid of being seen, some enterprising pilgrim had erected and put in operation a saw-mill, on the banks of the Genesee. One day as he was sitting on the log, eating his bread and cheese, a large black bear came from the woods towards the mill. The man, leaving his luncheon on the log, made a spring, and seated himself on a beam above; when the bear, mounting the log, sat down with his rump towards the saw, which was in operation, and commenced his appetite on the man's dinner. After a little while, the saw approached near enough to interfere with the feathers on Bruin's back, and he hitched along a little and kept on eating. Again the saw came up, and scratched a little flesh. The bear then whirled about, and throwing his paws around the saw, held on till he was mangled through and through, when he rolled off, fell through into the flood, and bled to death.

[1] *Ursus maritimus*, Lin.

lengthened than that of the brown bear, and the body is longer in proportion to its bulk. In the Polar seas it may literally be said to swarm. There, it is seen not only on the land and fixed ice, but on floating ice several leagues out at sea In the latter manner, white bears are sometimes conveyed to Iceland, where they are so much dreaded by the inhabitants that a crusade is immediately commenced against them. At sea, the food of this animal is fish, seals, and the carcases of whales; on land, it preys upon deer and other animals, and will eat various kinds of berries. In winter, it beds itself deeply under the snow or eminences of ice, and awaits, in a torpid state, the return of the sun. It suffers exceedingly when exposed to great heat.

Of the ferocity of the Polar bear, Barentz gives a striking proof. In Nova Zembla they attacked his sailors, carried them off in their mouths with the utmost facility, and devoured them in sight of their comrades. A few years ago, some sailors in a boat, fired at and wounded one. In spite of his receiving another shot, he swam after the boat, and endeavored to climb into it. One of his feet was cut off with a hatchet, but he still pursued the aggressors to the ship. Numerous additional wounds did not check his fury; mutilated as he was, he ascended the ship's side, drove the sailors into the shrouds, and was following them thither, when a mortal shot stretched him dead on the deck.

But even this formidable animal is not without its good qualities. It is a faithful mate and an affectionate parent. Hearne tells us that, at certain seasons of the year, the males are so much attached to their mates, that he has often seen one of them, on a female being killed, come and put his paws over her, and rather suffer himself to be shot than abandon her.

"While the Carcase frigate, which went out some years ago to make discoveries towards the North Pole, was locked in the ice, early one morning the man at the mast-head gave notice that three bears were making their way very fast over the frozen ocean, and were directing their course towards the ship. They had, no doubt, been invited by the scent of some blubber of a walrus that the crew had killed a few days before; which had been set on fire, and was burning on the ice at the time of their approach. They proved to be a she bear and her two cubs; but the cubs were nearly as large as the dam. They ran eagerly to the fire, and drew out of the flames part of the flesh of the walrus that remained unconsumed, and ate it voraciously. The crew from the ship threw upon the ice great lumps of the flesh of the sea horse, which they had still remaining. These the old bear fetched away singly, laid every lump before her cubs as she brought it, and dividing it, gave to each a share, reserving but a small portion to herself. As she was fetching away the last piece, the sailors levelled their muskets at the cubs, and shot them both dead; and in her retreat they wounded the dam, but not mortally. It would have drawn tears of pity from any but unfeeling minds, to have marked the affectionate concern ex-

pressed by this poor beast in the last moments of her expiring young ones. Though she was herself dreadfully wounded, and could but just crawl to the place where they lay, she carried the lump of flesh she had fetched away, as she had done others before, tore it in pieces and laid it before them; and when she saw that they refused to eat, she laid her paws first upon one and then upon the other, and endeavored to raise them up. When she found she could not stir them, she went off, and when she had got to some distance, she looked back and moaned. Finding this to no purpose, she returned, and, smelling round them, began to lick their wounds. She went off a second time as before; and, having crawled a few paces, looked again behind her, and for some time stood moaning. But still her cubs not rising to follow her, she returned to them again; and, with signs of inexpressible fondness, went round pawing them and moaning. Finding at last that they were cold and lifeless, she raised her head towards the ship, and uttered a growl of despair, which the murderers returned with a volley of musket balls. She fell between her cubs, and died licking their wounds."

Mr Scoresby mentions a singular circumstance with respect to a part of this animal. "The liver, I may observe, as a curious fact," says he, "is hurtful, and even deleterious; while the flesh and liver of the seal, on which it chiefly feeds, are nourishing and palatable. Sailors who have inadvertently eaten the liver of bears, have almost always been sick after it: some have actually died; and the effects on others has been to cause the skin to peal off their bodies. This is, perhaps, almost the only instance known of any part of the flesh of a quadruped proving unwholesome."

THE LARGE LIPPED BEAR.[1]

This animal, which was first brought from India about forty years ago, was at first misnamed the five-fingered, or ursine sloth. It has, however,

[1] *Ursus labiatus*, Desm.

nothing in common with the family of the sloths, but is a genuine bear. This curious quadruped is said to have been brought from the interior part of Bengal, where it burrows in the ground. It is covered with black, shaggy hair, which on the back is twelve inches long, where it divides and forms a kind of bunch. The hair on its head is short, and the snout is of a yellowish white. The tail is so short as to be scarcely visible. Its lips are thin and very long, and furnished with muscles, by which it can protrude them in a most singular manner. Its legs and feet resemble those of the common bear, and on each foot it has five long, crooked, white claws, which it uses either together or separately, like fingers to break its food, and convey it to the mouth. It has no cutting teeth, but two very strong canine teeth, and six grinders in each jaw.

It is a gentle but sluggish animal, and feeds on bread, fruit, nuts, honey, or fat; but refuses roots, and the lean and muscular parts of flesh. In general, its motions are slow and languid; but when disturbed or irritated it appears rather lively, and utters a kind of short, abrupt roar

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THE BORNEAN BEAR.[1]

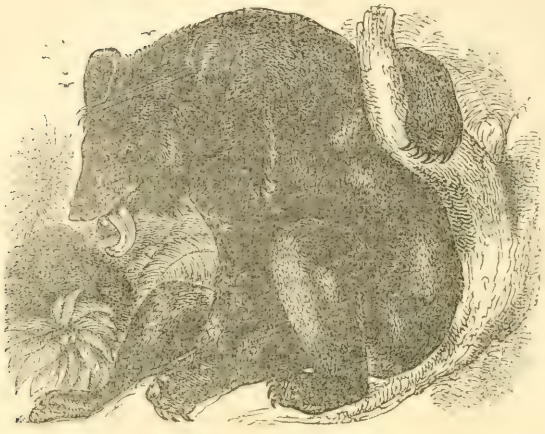
In one point, this native of Borneo differs strikingly from the other bears. Its head, instead of being flattened, is nearly hemispherical above, rising in a strong arch, immediately behind its obtuse and gradually attenuated nose. Its mouth is very expansible, and has a long, narrow, extensile tongue, which the owner can protrude nearly a foot, and then curve spirally inwards; a process which it frequently performs. The claws are very long,

[1] *Ursus malaianus*, Horsf.

firmly arched, tapering gradually to the point, and well calculated for digging the earth. Its short, glistening fur, rather rigid, yet soft to the touch, is a fine jet black on the body, head, and extremities. The muzzle is of a yellowish brown, and the anterior part of the neck has a large, broad patch, of a more bright and nearly orange tint, and an irregular quadrangular form, deeply notched above. From the muzzle to the tail, one individual measured three feet nine inches.

"It arrived in this country," says the author of the 'Tower Menagerie, "about four years ago; and formed, until lately, one of the most attractive and interesting spectacles, among the animals confined in the menagerie. It was brought from Borneo when very young, and during its passage was the constant associate of a monkey, and of several other young animals. It was thus domesticated in early life, and its manners in confinement greatly resembled those of the Malayan bear, observed by Sir Stamford Raffles, to which it was probably not inferior in sagacity or intellect. It could rest entirely on its posterior feet, and could even raise itself without difficulty, to a nearly erect posture; but was more generally seen in a sitting attitude at the door of its apartment, eagerly surveying the visiters, and attracting their attention by the uncouthness of its form, and the singularity of its motions. When a morsel of bread or cake was held at a small distance beyond its reach, it would thrust forward its upper lip as a proboscis, in a most ludicrous manner, at the same time making use of its paws to seize the object. After obtaining it and filling its mouth, it would place the remainder with great calmness on its posterior feet, and bring it in successive portions to its mouth. When craving for food, and also while consuming it, it emitted a coarse, but not unpleasant, whining sound, accompanied by a low, grunting noise; but if teased at this time, it would suddenly raise its voice to a harsh, grating tone. It was excessively voracious, and appeared disposed to eat almost without cessation; a propensity which finally cost it its life, having overgorged itself at breakfast one morning in the summer, during the hot weather, and dying within ten minutes afterwards. On seeing its keeper, it would often place itself in a variety of attitudes, to court his attention and caresses, extending its nose and anterior feet, or, suddenly turning round, exposing its back and waiting for several minutes in this posture with its head placed on the ground. It delighted in being patted and rubbed, even by strangers; but violently resented abuse and ill treatment. Its principal food was bread."

THE THIBET BEAR.[1]



This species, unless Cuvier and others are in error, is also to be found in Sumatra. It is particularly distinguished from the Malay and the large lipped bears, by the thickness of its neck, and the flatness of its head. It has a compact body and heavy limbs, and its claws are little more than half as long as those of the other Indian bears. The ears are very large. The muzzle is moderately thick, and somewhat lengthened; the upper part black, with a slightly reddish tint on the sides; the edges of the lips flesh colored, and the hair smooth. From the back part of the head, however, the hair becomes shaggy. A uniform jet black is its invariable color, except on the lower lip, which is white; and so also is a patch on the front of the neck, shaped like the letter Y, the oblique lines of which pass in front of the shoulders, while the lower line occupies the middle of the chest.

M. Duvaucel considers the Thibet bear to be somewhat ferocious. But the animal from which the cut was drawn, was tolerably tame, and was exceedingly fond of play in his own uncouth manner. He lived on bread and fruits, and nothing could induce him to taste flesh, either raw or cooked.

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[1] *Ursus thibetanus*, Cuv.

THE RACCOON.[1]

The raccoon is a native of most parts of North America; but it has never yet been found on the Old Continent. Buffon asserts that it is common in South America, but we believe it has never been found farther south than Mexico.

It is an animal of about the same size as a small badger; its body is short and bulky; its fur is fine, long, thick, blackish at the surface, and gray towards the bottom; its head is like that of the fox, but its ears are round and shorter; its eyes are large, of a yellowish green, and over them there is a black and transverse stripe; its snout is sharp; its tail is thick, but tapering towards a point, and marked alternately from one end to the other with black and white, and brownish rings, and is at least as long as the body: its fore legs are much shorter than the hind ones, and both are armed with five strong, sharp claws.

It inhabits the southern parts of the fur districts, being found as far north as Red river, in latitude fifty degrees, from which quarter about one hundred skins are procured annually, by the Hudson's Bay Company. If there is no mistake as to the identity of the species, the raccoon extends farther north on the shores of the Pacific than it does on the eastern side of the Rocky Mountains. Dixon and Portlock obtained cloaks of raccoon skins from the natives of Cook's river, in latitude sixty degrees; and skins supposed to be of the raccoon, were also seen at Nootka Sound, by Captain Cook. Lewis

[1] *Procyon lotor*, Lin. The genus *Procyon* has six upper and six lower incisors; two upper and two lower canines; twelve upper and twelve lower molars. Lower incisors on the same line; the three posterior molars tuberculous; feet pentadactyle; nails sharp; muzzle pointed; ears small; tail long; six ventral mammæ.

and Clarke expressly state that the raccoon, at the mouth of the Columbia, is the same with the animal so common in the United States. Desmarest says that the raccoon extends as far south as Paraguay. It is an animal, with a fox-like countenance, but with much of the gait of a bear, and being partially plantigrade, it was classed by Linnæus in the genus *Ursus*. In the wild state, it sleeps by day, comes from its retreat in the evening, and prowls in the night in search of roots, fruits, green corn, birds, and insects. It is said to eat merely the brain, or suck the blood of such birds as it kills. A low water, it frequents the sea shore to feed on crabs and oysters. It is fond of dipping its food into water before it eats, which occasioned Linnæus to give it the specific name of *lotor*. It climbs trees with facility. The fur of the racoon is used in the manufacture of hats, and its flesh, when it has been fed on vegetables, is reported to be good.

He may be tamed without difficulty, and is then very good-natured and sportive, but is as mischievous as a monkey, and seldom remains at rest. Of ill treatment he is extremely sensible, and never forgives those from whom he has received it. He has also an antipathy to sharp and harsh sounds, such as the bark of a dog and the cry of a child.

We shall insert here, the greater part of a letter written by M. Blanquart de Salines, to Count de Buffon, on the correctness of which full reliance may be placed.

"My raccoon was always kept chained before he came into my possession, and in this captivity he seemed sufficiently gentle, though not caressing; all the inmates of the house paid him the same attention, but he received them differently; treatment he would submit to from one person, invariably offended him when offered by another. When his chain was occasionally broken, liberty rendered him insolent; he took possession of his apartment, suffering no one to approach him, and was with difficulty again confined. During his stay with me, his confinement was frequently suspended; without loosing of him, I allowed him to walk about with his chain on, and he expressed his gratitude by various movements. It was otherwise when he escaped by his own efforts: he would then ramble for three or four days together over the neighboring roofs, and only descend at night into the yards, enter the hen-roosts and destroy the poultry, especially the Guinea fowls, eating nothing but their heads. His chain did not render him less sanguinary, though it made him more circumspect: he then employed stratagem, allowing the poultry to familiarize themselves with him by partaking of his food; nor was it until he had induced them to feel in perfect security, that he would seize a fowl and tear it in pieces; he also killed kittens in the same manner.

"If the raccoon be not very grateful for favors received, he is singularly sensible of bad treatment; a servant one day struck him some blows with a stick, and often afterwards vainly endeavored to conciliate him, by offering eggs and shrimps, of which the animal was very fond. At the approach of

this servant, he became enraged, and with sparkling eyes would spring towards him, making violent outcries; under such circumstances, he would accept of nothing, until his enemy had with drawn. The voice of the raccoon, when enraged, is very singular, sometimes resembling the whistling of a curlew, and at others the hoarse barking of an old dog. When struck by any one, or attacked by an animal stronger than himself, he offered no resistance; like the hedge-hog, he hid his head and paws, by rolling his body in form of a ball, and would have suffered death in that position. I have observed that he never left hay nor straw in his bed, preferring to sleep on the boards; when litter was given, he threw it away immediately. He did not seem very sensible to cold, and passed two out of three winters exposed to all the rigors of the season, and did well, notwithstanding he was frequently covered with snow. I do not think he was solicitous to receive warmth; during some frosts, I gave him separately warm water and water almost frozen, to soak his food in, and he always preferred the latter. He was at liberty to sleep in the stable, but often preferred passing the night in the open yard."

THE BROWN COATI.[1]

This animal, of which we are now about to treat, many authors have called *coatimundi*. It is very different from the animal described in the preceding article. It is of a smaller size than the raccoon; its body and neck, its head and nose, are of a more lengthened form; its upper jaw is an inch, or an inch and a half longer than the lower one, and its snout, which is moveable in every direction, turns up at the point. The eyes of the coati are also smaller than the eyes of the raccoon, and are surrounded by three

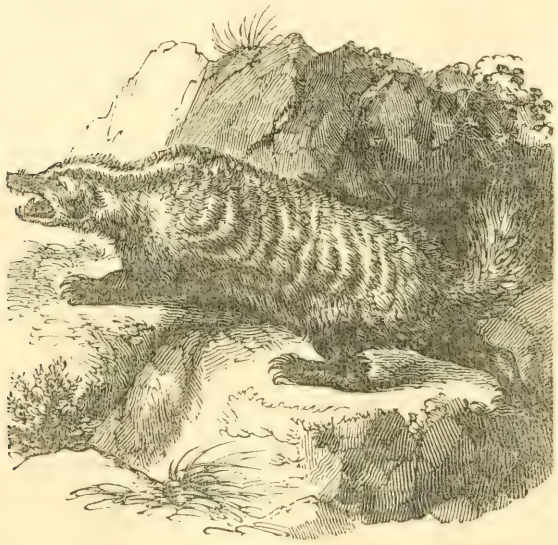
[1] *Nasua fusca*. The genus *Nasua* has six upper and six lower incisors; two upper and two lower canines; twelve upper and twelve lower molars. Lower incisors on the same line; three posterior molars, tuberculous; feet pentadactyle, armed with strong nails; nose much prolonged and moveable; tail long; six ventral mammæ.

white spots; its hair is longer and coarser, its legs are shorter, and its feet longer; but, like the raccoon, its tail is diversified with rings, alternately black and fulvous; and to all its feet there are five claws.

This animal has a practice of eating its own tail, which, when not mutilated, is longer than its body, and which it generally rears aloft, and can move with ease in any direction.*

As for the coati in other respects, it is an animal of prey, which subsists on flesh and blood, which, like the fox, destroys small animals and poultry, hunts for the nests of little birds, and devours their eggs; and it is probable from this conformity of disposition, that some authors have considered the coati as a species of small fox. It inhabits the woods of South America. In pursuit of its prey, it climbs trees with much agility. When tamed, which it easily is, it is fond of being caressed, but does not become much attached to its owner.

THE EUROPEAN BADGER[1]



is a lazy, distrustful, solitary animal, that retires far from the approach of

* Godman says, "It has been considered very wonderful that this animal should *eat its own tail*, which certainly *appears* to be the fact. The extreme length of its tail, in which the blood circulates but feebly, exposes it to the influence of the cold or frost; and the exceedingly tormenting irritation produced thereby, leads the animal to gnaw and scratch the tail to relieve the excessive itching. The disease spreads, and the anguish induces the coatimundi to gnaw more furiously, and eventually his life is destroyed by the extension of the inflammation and irritation to the spine, &c."

[1] *Taxus vulgaris*. The genus *Taxus* has six upper and six lower incisors; two upper and two lower canines: ten upper and twelve lower molars. The first molar very small,

man, and digs a subterraneous residence, where it spends, at least, three fourths of its existence, and never ventures forth but in search of food. It burrows in the ground with particular facility, as its body is rather of an oblong form, and its claws, those especially of the fore feet, are very long and compact. The hole which it thus forms often proceeds to a great depth below the surface of the earth, and the passage to it is always oblique and winding.

The fox, who is less expert at such excavations, often appropriates to his own convenience the labors of the badger.

Unable to compel him from his retreat by force, it drives him from it by stratagem, often remains a fixed sentinel at the mouth of the passage, disturbs it, and, as an infallible expedient, it is said, emits his ordure. The badger gone, he immediately assumes possession of it, enlarges it, and every way accommodates it to his own purpose. Though forced to remove to another habitation, this animal does not, however, remove to another country. At a little distance from its old burrow, it forms a new one, from which it never stirs but at night. The dogs easily overtake it when it is at any distance from its hole, and then, using all its strength, and all its powers of resistance, it throws itself upon its back, and defends itself with desperate resolution. It has one single advantage over its assailants. The skin is so thick, and especially so loose, that the teeth of the dogs can make little impression on it, and the badger can turn himself round in it, so as to bite them in their tenderest parts.

The young badgers are easily tamed; they will play with young dogs, and, like them, will follow any person whom they know, and from whom they receive their food; but the old ones, in spite of every effort, still remain wild. They are neither mischievous nor voracious, as the fox and the wolf are, yet they are carnivorous; and though raw meat is their favorite food, yet they will eat any thing that comes in their way, as flesh, eggs, cheese, butter, bread, fish, fruit, nuts, roots, &c. They sleep the greater part of their time, without, however, being subject, like the mountain rat or the dormouse, to a torpor during the winter; and thus it is that though they feed moderately, yet they are always fat.

Their hole they keep exceedingly clean, nor are they ever known to void their ordure in it. The male is rarely to be found with the female. In summer she brings forth, and her usual number at a birth is three or four. These she feeds at first with her milk, and afterwards with such petty prey as she can surprise. She seizes young rabbits in the warren, robs birds of their young, while yet in the nest, finds out where the wild bees have laid up their honey, where field-mice, lizards, serpents, and grasshoppers are to

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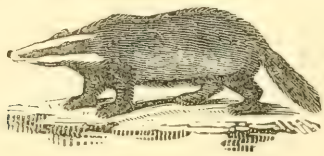
the second and third pointed, the fourth cutting on the external side, the fifth tuberculous and large; body low upon the legs; pentadactyle; nails robust; tail short; an anal pouch, containing a fetid secretion.

be met with; and carries all to her expecting brood, which she frequently brings forward to the mouth of her hole.

These animals are naturally of a chilly temperament. Such as are reared in a house seem to be never more happy than when near a fire. They are likewise very subject to the mange; and, unless carefully washed, the dogs that penetrate into their burrows are seized with the same distemper.

The hair of the badger is always filthy; between the anus and the tail there is an opening, which, though it has no communication with any interior part, and is hardly an inch deep, continually emits an oily liquid. This the animal is fond of sucking. Its flesh, when the animal is well fed, makes excellent hams and bacon; and of its skin are made coarse furs, collars for dogs, and trappings for horses. The hair is used for painters' brushes.

THE AMERICAN BADGER.[1]



The American badger, as compared with the European, is generally less in size, and of a lighter make; the head, though equally long, is not so sharp towards the nose, and the markings on the fur are remarkably different. A narrow white line runs from between the eyes towards the back, the rest of the upper part of the head is brown, the throat and whole under jaw are white, the cheeks partly so; a semicircular brown spot is placed between the light part of the cheeks, and the ears.

The American badger frequents the sandy plains or prairies, which skirt the Rocky Mountains, as far north as latitude fifty-eight degrees. It abounds on the plains watered by the Missouri, but its exact southern range has not, as far as I know, been defined by any traveller. The sand prairies, in the neighborhood of Carlton-house, on the banks of the Saskatchewan, and also on the Red River, that flows into Lake Winnipeg, are perforated by innumerable badger-holes, which are a great annoyance to horsemen, particularly when the ground is covered with snow.

Whilst the ground is covered with snow, the badger rarely comes from its hole; and I suppose that in that climate it passes the winter from the beginning of November to April, in a torpid state. Indeed, as it obtains the small animals on which it feeds by surprising them in their burrows, it

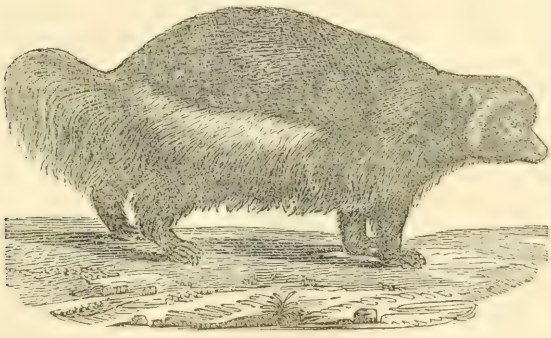
[1] *Taxus Labradorica.*

has little chance of digging them out at a time when the ground is frozen into a solid rock. Like the bears, the badgers do not lose much flesh during their long hibernation; for on coming abroad in the spring, they are observed to be very fat. As they pair, however, at that season, they soon become lean.

This badger is a slow and timid animal, taking to the first earth it comes to, when pursued; and as it makes its way through the sandy soil with the rapidity of a mole, it soon places itself out of the reach of danger. The strength of its fore feet and claws is so great, that one which had insinuated only its head and shoulders into a hole, resisted the utmost efforts of two stout young men, who endeavored to drag it out by the hind legs and tail, until one of them fired the contents of his fowling piece into its body. Early in the spring, however, when they first begin to stir abroad, they may be easily caught by pouring water into their holes; for the ground being frozen at that period, the water does not escape through the sand, but soon fills the hole, and its tenant is obliged to come out.

The American badger appears to be a more carnivorous animal than the European one. A female which I killed, had a small marmot, nearly entire, together with some field mice, in its stomach. It had also been eating some vegetable matters. — *Richardson*.

THE WOLVERENE.[1]



This animal has a broad, compact head, which is suddenly rounded off on every side, to form the nose. In the shape of its jaws it resembles a dog. Its ears are low, rounded, and much hid by the surrounding fur. The back

[1] *Gulo arcticus*. The genus *Gulo* has six upper and six lower incisors; two upper and two lower canines; ten or eight upper and twelve lower molars. The three first molars in the upper and the four in the lower jaw small, succeeded by a large carnivorous tooth, and a small tuberculous one at the back; body low; head moderately elongated; ears short and round; tail short; feet pentadactyle; toes with crooked nails; no anal pouch.

is arched, the tail low and bushy; the legs thick and short; and the whole aspect of the animal indicates strength without much activity. The fur bears a great similarity to that of the black bear, but is not so long, nor of so much value.

The wolverene is a carnivorous animal, which feeds chiefly upon the carcasses of beasts that have been killed by accident. It has great strength, and annoys the natives by destroying their hoards of provision, and demolishing their marten traps. It is so suspicious, that it will rarely enter a trap itself, but beginning behind, pulls it to pieces, scatters the logs of which it is built, and then carries off the bait. It feeds also on meadow mice, marmots, and other *rodentia*, and occasionally on disabled quadrupeds of a larger size. We have seen one chasing an American hare, which was at the same time harassed by a snowy owl. It resembles the bear in its gait, and is not fleet; but it is very industrious, and no doubt feeds well, as it is generally fat. It is much abroad in the winter, and the track of its journey in a single night may be traced for many miles.

This animal inhabits northern Europe and America. It is about the size of the badger. The above description is from Dr Richardson.

THE POLECAT[1]

Is about seventeen inches in length; of a deep chocolate color, nearly approaching to black; has short ears, tipped with white, and the tail is covered with longish hair. In summer he generally lives in woods, thick brakes, or rabbit warrens. His burrow is about two yards deep, and commonly ends under the root of a tree. In winter, he haunts barns, hay-lofts, and other out-houses, whence he sallies forth on the poultry.

When heated, or enraged especially, it sends forth and diffuses a stench that is absolutely intolerable. The dogs will not eat its flesh; and even its skin, though good in itself, sells at a very low price, as it can never be entirely divested of its natural odor.

These animals are very destructive to young game of all kinds, and commit dreadful devastations among pigeons when they get into a pigeon-house. Without making so much noise as the weasel, they do a great deal more mischief; dispatching each victim with a single wound in the head, and satiating themselves with copious draughts of blood, after which they carry off the prey: or if the aperture by which they entered will not admit of this, they first eat the brains, and then carry away the head, leaving the body behind. They are also extremely fond of honey, and are frequently known,

[1] *Mustela putorius*, LIN. The genus *Mustela* has six upper and six lower incisors; two upper and two lower canines; eight or ten upper and ten or twelve lower molars. Body elongated; head small and oval; ears short and round; legs short; feet pentadactyle, armed with sharp, hooked claws. No anal pouch.

in winter, to attack the hives, and drive away the bees. Rabbits, however, seem to be their favorite prey, and a single polecat is often sufficient to destroy a whole warren. They will also catch and eat fish, though, probably, this is done by them only when other food is not attainable. This animal is not a native of America.

THE FERRET.[1]

This animal is by nature a mortal enemy to the rabbit. If even a dead one is presented to a young ferret, which had never seen one before, it springs at it, and tears it with fury; if it be a living one, it seizes it by the neck and nose, and instantly begins to suck its blood. When the ferret is let loose into the burrows of the rabbits, it is necessary to muzzle him, that he may not kill them at the bottom, but only oblige them to run out, and thereby fall into the net laid for them at the entry. If he is allowed to go unmuzzled, there is a risk of losing him, because, after having sucked the blood of the rabit, he will fall asleep; and the smoke which is raised at the mouth of the burrow does not always prove a sufficient expedient for bringing him back, as there are often more issues than one, and as one burrow generally communicates with others, in which the ferret is apt to be the more bewildered, the more he is surrounded with the smoke.

The ferret has a yellowish fur, and red eyes. It is nearly fourteen inches long, and is thought by Cuvier to be only a variety of the polecat.

THE WEASEL.[2]

The common weasel is as frequent in temperate and in hot countries, as it is scarce in cold ones.

The weasel is the smallest of the class to which it belongs, and is an active and handsome little animal. Exclusive of the tail, it is not seven inches in length; and its height is not more than two and a half. The tail, which is bushy, measures about two inches and a half. The color of the weasel is a pale reddish brown on the back and sides, but white under the throat and

[1] *Mustela furo*, Lin. [2] *Mustela vulgaris*, Lin.

belly. The eyes are small and black; the ears short and roundish; and the nose is furnished with whiskers, like those of a cat. It moves by unequal leaps, and can spring several feet from the ground, or run up a wall without difficulty.

When a weasel enters a hen-roost, it never meddles with the cocks or the old hens; it makes choice of the pullets, the young chickens, and these it kills with a single stroke on the head, and carries away one after another. The eggs it sucks with incredible avidity; making a small hole at one end, through which it licks out the yolk. In winter, it generally resides in some granary, or hay-loft; where the female often continues even in the spring, in order to bring forth her young among the hay or straw. During this time, the weasel makes war with the rats and mice, with more success than the cat, since, following them into all their holes, it is next to an impossibility for them to escape. It also climbs up to the pigeon houses, to the nests of sparrows, &c., and commits great havoc. In summer, it removes to some distance from the houses, always choosing the lower lands about the mills and streams, hiding itself among the bushes, in order to catch the birds, and not unfrequently taking up its habitation in the hollow of an old willow. The female generally brings forth four or five. The young ones come forth with their eyes shut, but in a little time they attain a sufficiency of growth and strength to follow their mother to the chase. They attack adders, water rats, moles, field mice, &c., and, traversing the meadows, devour quails and their eggs.

Like the polecat and the ferret, these animals have so strong a scent that they cannot be kept in any place that is inhabited. As their own smell is very bad, they seem to sustain no inconvenience from any foreign stench or infection. A peasant took, one day, three weasels newly brought forth in the carcass of a wolf, which had been suspended by its hind legs, from one of the branches of a tree; and though the wolf was almost entirely rotten, the old weasel, nevertheless, brought moss, straw, and leaves, in order to make a bed for her young ones in the cavity of the thorax. The weasel may be tamed, and is then very good tempered, and excessively curious.

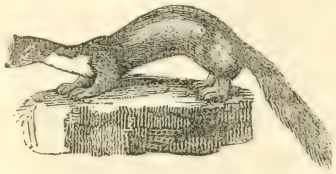
THE ERMINE, OR STOAT.[1]

The weasel with a black tail is called the ermine when it is white, and the stoat, when it is red or yellowish. Though it is a less common animal than the weasel, yet there are numbers to be found in the old forests, and sometimes during the winter in the neighborhood of woody grounds. It is always easy to distinguish it from the common weasel, because the tip of its tail is uniformly of a deep black, while the edges of its ears, and the extremities of its feet, are white.

[1] *Mustela erminea*, Desm.

Godman considers the common weasel of the United States to be the same as the ermine or stoat of Europe. He says that in the middle and eastern States, it is most generally known as the *weasel*. Farther north, it is called *stoat* in its summer, and ermine in its winter pelage of pure white. Richardson says that both the ermine or stoat, and the common weasel of Europe, are indubitably found in America; the former extending to the most remote arctic districts, and the latter as far north as the Saskatchewan river.

THE PINE MARTEN, OR PINE WEASEL,[1]



Originally a native of the north, is in a manner peculiar to that climate, where it is so numerous, that the quantity of furs produced from this animal alone, and carried into foreign countries, is actually astonishing. In temperate climates, on the contrary, it is rarely, and in warm climates never, to be found. Some there are in Burgundy, and some in the forest of Fontainbleau; but in general they are as scarce in France as the beech marten is common. It is not uncommon in the wild parts of Scotland, among the wooded ravines of the mountains.

Alike averse to open countries, and to countries which are inhabited, it remains in the bosom of some forest, ranges below through the labyrinths of the thicket, or towers aloft upon the branches of trees. It subsists by the chase, and destroys a prodigious quantity of birds, whose nests it searches for, and invades, in order to devour the eggs. Of the squirrel, the dormouse, &c., it also makes a prey; and it is known to eat honey, as well as the beech marten. In the description of the wild cat, will be found an account of the combats of that animal with the pine marten.

To this, may be added, with respect to the latter, that it is said to be sometimes victorious, even over the golden eagle, when that bird pounces on it as its prey. It seizes the aggressor by the throat, and the loss of blood soon brings down the eagle lifeless from its "pride of place."

Its neck is yellow, whereas that of the beech marten is white; and its hair, at the same time, is much finer, thicker, and less subject to shed.

When the female is near her time, her custom is to climb to the nest of some squirrel, to drive her from it, to enlarge it for her own purpose, and to

[1] *Mustela martes*, Lin.

bring forth her young in it. In the same manner, she occupies the old nests of the owl and the buzzard, as also the hollow places of trees, from which she presently dislodges the woodpecker, and other birds.

THE SABLE.[1]

This animal resembles the marten, and is found in great numbers in Siberia and Kamtschatka. Its fur is very valuable, and the Russian government derives considerable revenue from its sale. Pennant and Godman both say it is found in the northern parts of our continent; but Richardson does not mention it in his Fauna Boreali Americana.

THE SKUNK.[2]

This animal inhabits the whole of North America, and is also found throughout a part of the southern portion of that continent. A considerable number of animals of this genus are natives of America, resembling each other strongly in form and size, but differing in the number and variety of their stripes and markings, have been described by authors as so many distinct species. Baron Cuvier thinks that the present state of our knowledge of these animals does not warrant us in considering them otherwise than as varieties of a single species, and of these varieties he enumerates fifteen.

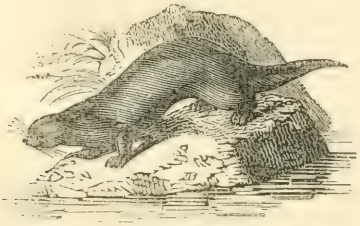
[1] *Mustela zibellina*, Pallas.

[2] *Mephitis Americanus*, Desm. The genus *Mephitis* has six upper and six lower incisors; two upper and two lower canines; eight upper and ten lower molars. Body elongated, arched; toes of the foot separated, and armed with strong nails, the anterior formed for digging; tail long and bushy, or none.

This animal is of a brown color, marked sometimes with two white stripes. The faculty this animal possesses, of annoying its enemies by the discharge of a noisome fluid, causes it to be rather shunned than hunted, which the value of its skin would otherwise be sure to occasion. The smallest drop of this fluid is sufficient to render a garment detestable for a great length of time. Washing, smoking, baking, or burying articles of dress, seem to be equally inefficient for its removal.

The skunk is generally found in the forests, having its den either in the stump of an old tree, or in an excavation in the ground. It feeds on the young of birds, and upon small quadrupeds, eggs, wild fruits, &c. It also does much mischief in the poultry yard.

THE OTTER.[1]



The common otter is of a deep brown color, and is usually about two feet in length from the tip of the nose to the insertion of the tail; the head and nose are broad and flat; the mouth bears some similitude to that of a fish; the neck is short, and equal in thickness to the head; the body long; the tail broad at the insertion, but tapering off to a point, and about sixteen inches long; the eyes are very small, and placed nearer to the nose than is customary in quadrupeds. The legs are very short, but remarkably strong, broad and muscular, and so placed as to be capable of being brought into a a line with the body, and performing the office of fins; and each foot is furnished with five toes, connected by strong, broad webs, like those of water fowl.

Accurately considered, the otter cannot be pronounced an amphibious animal. We even find them drowned, when they happen to have been entangled in a net; and this, evidently, for want of having had time to destroy it, and thereby effect their escape. For want of fish, frogs, water rats, or other nourishment, it will eat the young branches and the bark of aquatic trees; and in spring it will eat new grass.

[1] *Lutra vulgaris*, Lin. The genus *Lutra* has six upper and six lower incisors; two upper and two lower canines; ten upper and ten lower molars. Head large and flattened; ears short; body long; low upon the legs; toes webbed; nails crooked; tail long, flattened horizontally.

These voracious animals are generally found at the sides of lakes and rivers, but particularly the former, in which they destroy so much more than they devour, that they will sometimes spoil a pond in the space of a few nights. They do equal mischief by tearing in pieces the fishermen's nets, which they infallibly do, whenever they happen to get entangled in them. In forming its retreat the otter displays great sagacity. It makes the entrance under water, burrows upwards, provides several cells to retire to in case of floods, and opens on the surface a small orifice for the admission of air, which orifice it contrives so as to be concealed by a thick bush. The female goes with young about nine weeks, and generally produces four or five at a time. These are always found at the edge of the water; and, if under the protection of the dam, she teaches them, on the approach of an enemy, to plunge, like herself, into the deep, and escape among the weeds or rushes that fringe the stream. It is, therefore, only in the absence of the dam, that the young can be taken; and in some places there are dogs purposely trained for discovering their retreats. One of the favorite pastimes of the otter is, to get on a high ridge of snow, bend his fore feet backward, and slide down the side of it, sometimes to the distance of more than twenty yards.

If taken while young, the otter may be tamed and taught to fish for its master, and will become almost as affectionate and docile as the dog.

For the destruction which he makes among the finny tribe, and also the disturbance which he gives them in their haunts, the otter is an object of abhorrence to the angler. Old Izaak Walton calls them "villainous vermin," and many other hard names, and declares that, in his judgment, "all men that keep otter-dogs ought to have pensions from the king, to encourage them to destroy the breed of these base otters."

Unless it can be shot, it is difficult to capture the otter, when the water is not frozen, as it takes to the water, dives, and occasionally "vents," as the hunter terms it; that is, raises its nose to the surface to breathe. "The old hunters, (says a recent writer,) who set more value upon the difficulty of the capture, than on the prey itself, attack the otter *in posse comitatus*, beat the banks with dogs, hedge in a space with nets, and assail the otter with clubs and spears, when he comes up to breathe." This was precisely the manner in which an otter hunt was conducted in the days of honest Izaak, and he seems to have considered it as the finest of all sports, except angling.

THE CANADA OTTER.[1]

The Canada otter resembles the European species in its habits and food but it may be distinguished from it, by the fur of its belly being of the same

[1] *Lutra Canadensis*, Desm.

shining brown as its back. It is a much larger animal, and has, in proportion, a shorter tail than the European one. In the winter season it frequents rapids and falls, to have the advantage of open water, and when its usual haunts are frozen over, it will travel to a great distance, through the snow, in search of a rapid which has resisted the severity of the weather. If it is seen, it throws itself on its belly, and slides through the snow for several yards, leaving a deep furrow behind it. This movement is made with great rapidity. When closely pressed, it will turn and defend itself with great obstinacy. It inhabits the Mackenzie and other rivers nearly to the Arctic Sea, and the western parts of the United States.

THE SOUTH AMERICAN OTTER.[1]

The color of the South American otter is different from that of the European: the latter is much darker; and the male is still darker than the female, who generally gets brown while suckling her puppies; Abbé Ricardo says that they change coats. The skin is now more valuable than formerly, and is used for pistol covers, and foraging regimental caps are made of them. The skins of otters are also used for segar cases, and the Indians eat their flesh. In destroying fish, the otter rejects the head, and will not use it, although pressed by hunger. In Buenos Ayres there is one quite domesticated, which will invariably bring home what it gets in the river: but tame habits make it lazy and indolent; it is vicious during the breeding season, and is obliged to be chained.

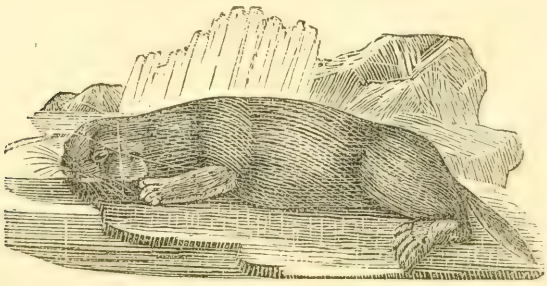
The sport of otter hunting in South America is thus described by a recent traveller:—In the month of May, the parties assemble by previous arrangement, composed principally of the chief inhabitants and their relatives or clans, and visiters, male slaves, muleteers, &c. Having ascended the waterfalls, they encamp near those clear and transparent rivers in which otters abound. After the business of physicing the bloodhounds and a species of blueish cur without any hair, they make their hunting dispositions, and appoint their land and water captains to head each party; the duty of the latter is to stand in the prow of the canoe, and cheer the dogs to the prey. The huntsman, in fact, is mostly an Indian, as those dogs will not hunt to any other tongue; what this is owing to, whether custom or sagacity, I know not, but it is certainly the case; however, the young Spaniards and Creoles have latterly remedied this defect, and are now as well qualified to hunt a bloodhound in the Indian tongue as an Indian himself. Both parties having armed themselves with otter spears, barbed like harpoons, and with handles made of rough, light wood, about ten feet in length, they cheer on the bloodhounds, who no sooner wind the prey than they join

[1] *Lutra Braziliensis*, Gmel.

chorus with their huntsman, until they arrive near the Calle Pero, or otter city, when the land party divides into three; one watches; another ascends the ford; while the other pokes the banks, in order to eject the creature. As soon as he is started, the hounds are again in full cry, and the curs are loosed to dive after him, and will relieve each other in this task: as soon as one is up, down goes the other, while the hounds keep up the cry in the water at a slow pace, until they eventually force the creature to the head of the stream into shallow water, where these curs either snap him up, or he is speared by the hunters; after this the hounds are allowed the gratification of mouthing him until satisfied, when they again return to depopulate this little commonwealth of otters.

In their abode the heads, tails, fins, and fragments, of several species of fish will be seen. As he seldom eats more than a mouthful of each fish, he must cause a frightful destruction among the finny race, and his depredations cause his haunts to be found out at low water, when the hounds would otherwise pass him.

THE SEA OTTER.[1]



This harmless, playful, and interesting animal is generally about four feet long, thirteen inches of which are occupied by the tail. The fur is of great value, it being soft and of a deep glossy black. It has long been exported in great quantities by the Russians, who received eighty or a hundred rubles from the Chinese for each skin until the market was overstocked. The sea otter is to be found only within a very few degrees of latitude in the North Pacific; its range being mostly confined to the coast of Kamtschatka, the adjoining islands, and the opposite American shore. Sea otters are perfectly inoffensive, and so sportive that much of their time seems to be passed in playing diverting tricks. They live in pairs, and are very constant to each other. Such is their fondness for their young, that they will never abandon them; on being robbed of them they will starve themselves to death, and will endeavor to breathe their last on the spot where their offspring were destroyed.

[1] *Lutra marina*, Desm.

THE DOG.[1]

Largeness of the frame, elegance of the form, strength of the body, freedom of the motions, and all the exterior qualities, are not the noblest properties in an animated being; and, as in mankind, understanding is referred to figure, courage to strength, and sentiment to beauty, so the interior qualities are those which we esteem most in animals; for it is in these that they differ from the automaton; it is by these they are raised above the vegetable, and made to approach nearer to ourselves; it is their sense which ennobles their being, which regulates, which enlivens it, which commands the organs, makes the members active, gives birth to desire, and gives to matter progressive motion, will, and life.

The dog, independently of his beauty, vivacity, strength, and swiftness, has all the interior qualities which can attract the regard of man. The tame dog comes to lay at his master's feet his courage, strength, and talents, and waits his orders to use them; he consults, interrogates, and beseeches; the glance of his eye is sufficient; he understands the signs of his will. Without the vices of man, he has all his ardor of sentiment; and, what is more, he has fidelity and constancy in his affections; no ambition, no interest, no desire of revenge, no fear but that of displeasing him, he is all zeal, all warmth, and all obedience; more sensible to the remembrance of benefits than of wrongs, he soon forgets, or only remembers them to make his attachment the stronger; far from irritating, or running away, he even exposes himself to new proofs; he licks the hand which is the cause of his pain, he only opposes it by his cries, and at length entirely disarms it by his patience and submission.

In deserts, and depopulated countries, there are wild dogs, which in their manners differ only from wolves, by the facility with which they are tamed; they unite also in large troops, to hunt and attack by force wild boars and bulls, and even lions and tigers.

Dogs which have been abandoned in the deserts of America, and have lived wild for a hundred and fifty, or two hundred years, though changed from their original breed, since they are sprung from domestic dogs, have, notwithstanding this long space of time, retained, at least in part, their primitive form, and travellers report that they resemble our greyhound.*

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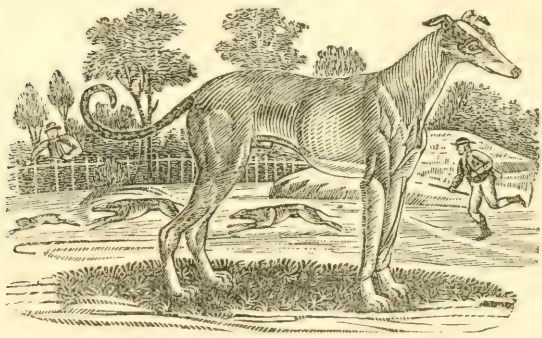
[1] *Canis familiaris*, Lin. The genus *Canis* has six upper and six lower incisors; two upper and two lower canines; twelve upper and fourteen lower molars. The three first molars in the upper jaw, and the four in the lower, small edged; the great carnivorous tooth above bicuspid, with a tubercle on the inner side; two tuberculous teeth behind each of the large carnivorous ones; muzzle elongated; tongue soft; ears erect; fore feet pentadactylous; hind feet tetradactylous; teats inguinal and ventral.

* It must not be understood that the dog is not an original inhabitant of America. Godman remarks that the people of the northern parts of America and Asia, have, for ages beyond the memory of man, employed dogs as beasts of burden, or for draught. The dogs of the Esquimaux, and other aborigines of this continent, differ much in size and color, yet they are all of a breed apparently intermediate to the wolf and fox.

These wild dogs, however, are extremely thin and light; and as the grey hound does not differ much from the cur, or from the dog which we will call the shepherd's dog, it is natural to think, that these wild dogs are rather of this species, than real greyhounds; since on the other side, ancient travellers have said, that the dogs of Canada had the ears straight like foxes, and resembled the middle sized mastiff, that is, our shepherd's dog, and that those of the deserts of the Antilles isles, had also the head and ears very long, and in appearance very much resemble foxes.

Dogs are commonly born with their eyes shut: the two eyelids are not only closed, but adhere by a membrane, which breaks away as soon as the muscle of the superior eyelid is become strong enough to raise it and to overcome this obstacle; and the greater number of dogs have not their eyes open till the tenth or twelfth day. They attain their growth in two years. The dog is old at fifteen years, and seldom lives beyond twenty.

THE GREYHOUND.[1]

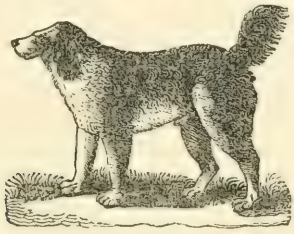


This elegantly formed animal was once held in such estimation, that it was the peculiar companion of a gentleman, who was anciently known by his horse, his hawk, and his greyhound. In such repute was it, that Canute enacted a law that it should not even be kept by any one who was under the rank of a gentleman. It has a long body, a neat and elongated head, full eye, long mouth, sharp and very white teeth, little ears, with thin gristles in them, a straight neck and full breast; his fore and hind legs are long and straight; his ribs round, strong, and full of sinews, and taper about the belly. It is the swiftest of the dog kind, and easily trained for the chase when twelve months old. It courses by sight and not by scent, as other hounds do; and is supposed to outlive all the dog tribe. Buffon

[1] *Canis familiaris graius.*

imagines it to be descended from the Irish greyhound, only rendered more thin and delicate by the influence of climate. There is a variety of this species, which is called the Highland greyhound. It is very large, strong, deep-chested, covered with long rough hair, and has the scent and sagacity of the bloodhound. This kind has become exceedingly scarce.

THE SPANIEL.[1]



This beautiful animal is of Spanish extraction, whence it derives its name, and the silky softness of its coat. It is elegant in form, with long pendent ears, and hair gracefully curled or waved. Its scent is keen, and it possesses in the fullest perfection the good qualities of sagacity, docility, and attachment. So strong is the latter, that instances have been known in which the animal has died of grief for the loss of its master. Dash, a spaniel belonging to the gamekeeper of the Rev. Mr Corsellis, would not quit his master's bed after his death; being taken away, he perpetually returned to the room, and daily visited the grave; and, in spite of all the kindness that was shown him, he died at the end of fourteen days. The land spaniel may be taught a variety of tricks, such as fetching, carrying, and diving. He is employed in setting for partridges, quails, &c., and his steadiness and patience, in the performance of this task, are worthy of admiration.

THE WATER SPANIEL.[2]

Of all the dog kind, this anima. seems to be the most docile, and the most attached to man. Many other species are impatient of correction; but the water spaniel, though fierce to strangers, bears blows and ill usage from his master with undiminished affection. This creature is well calculated for hunting of otters, ducks, &c. Watching the stroke of the piece and perceiving the game that is shot, he instantly swims after it, and brings it to

[1] *Canis fam. ex'rarius.* [2] *C. f. aquaticus.*

his master. He will fetch and carry at command, and will dive to the bottom of deep water in search of a piece of money, which he will bring out, and deposit at the feet of the person by whom he was sent. Cowper has recorded, in a pleasing poem, an instance of sagacity and of a desire to gratify a master, which was displayed by his spaniel, Beau. As he was walking by the Ouse, he was desirous to obtain one of the water-lilies, which grew in the river, but was unable to reach it. Beau seemed disposed to assist him, but the poet called him off, and pursued his ramble. On his return, however, Beau rushed into the stream, cropped a lily, and laid it at his master's feet.

THE HARRIER[1]

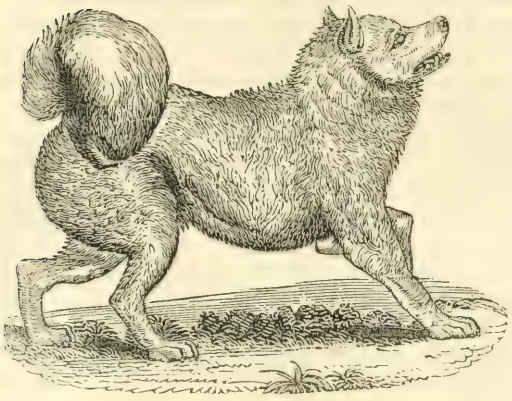
Is closely allied to the beagle, though larger, more swift, and vigorous. It is ardent in the chase, and frequently outstrips the fleetest sportsman. A mixed breed, between this and the large terrier, forms a strong, active, and hardy hound, which is used in hunting the otter. It is rough, wire-haired, thick-quartered, long-eared, and thin-shouldered.

THE SPANISH POINTER[2]

Is derived, as its name implies, from Spain, but has long been naturalized in England, where great attention has been paid to preserve the breed in all its purity. It is remarkable for the aptness and facility with which it receives instruction, and may be said to be almost self-taught; whilst the English pointer requires the greatest care and attention in breaking and training for the sport. But on the other hand, it is less capable than the English pointer of enduring fatigue. It is chiefly employed in finding partridges, pheasants, &c.

[1] *C. Gallicus.* [2] *C. avicularis.*

THE ESQUIMAUX DOG.[1]



This animal is one of those varieties of the dog, from which man receives obedience and affection. To the Esquimaux Indians his services are invaluable. He assists them to hunt the bear, the rein-deer, and the seal; in summer, while attending his master in the chase, he carries a weight of thirty pounds; in winter he is yoked to a sledge, and conveys his master over the trackless snows. Several of them drawing together, will convey five or six persons, at the rate of seven or eight miles an hour, and will travel sixty miles in a day. In winter he is scantily fed, and roughly treated, yet his fidelity remains unshaken. The Esquimaux dog does not bark. In appearance, he comes nearest to the shepherd's dog, and the wolf dog. His ears are short and erect, and his bushy tail curves elegantly over his back. His average stature is one foot ten inches, and the length of his body, from the back of the head to the commencement of the tail, is two feet three inches. His coat is long and furry, and is sometimes brindled, sometimes of a dingy red, sometimes black and white, and sometimes almost wholly black.

The manner in which the sledge is drawn by these animals, is described with much accuracy and spirit, by Captain Parry, in the Journal of his Second Voyage. "When drawing a sledge," says he, "the dogs have a simple harness, (annoo,) of deer or seal skin, going round the neck by one bight, and another for each of the fore legs, with a single thong leading over

[1] *C. Borealis.* This animal is a native of America, and is considered by Godman, as descended from the wolf and the fox. He observes, that they retain so much of the external appearance, and general carriage of the wild animal, as to leave no question of their descent from the same stock of the wolf, residing in the vicinity, and do not appear to be distinctly removed from that species, however long they may have been in the service of man.

the back, and attached to the sledge as a trace. Though they appear at first sight, to be huddled together without regard to regularity, there is, in fact, considerable attention paid to their arrangement, particularly in the selection of a dog of peculiar spirit and sagacity, who is allowed, by a longer trace, to precede the rest as leader, and to whom, in turning to the right or left, the driver usually addresses himself. This choice is made without regard to age or sex, and the rest of the dogs take precedency according to their training or sagacity, the least effective being put nearest the sledge. The leader is usually from eighteen to twenty feet from the fore part of the sledge, and the hindmost dog about half that distance; so that when ten or twelve are running together, several are nearly abreast of each other. The driver sits quite low, on the fore part of the sledge, with his feet overhanging the snow on one side, and having in his hand a whip, of which the handle is plaited a little way down to stiffen it, and give it a spring, on which much of its use depends; and that which composes the lash is chewed by the women, to make it flexible in frosty weather. The men acquire from their youth considerable expertness in the use of this whip, the lash of which is left to trail along the ground by the side of the sledge, and with which they can inflict a very severe blow on any dog at pleasure. Though the dogs are kept in training entirely by fear of the whip, and, indeed, without it, would soon have their own way, its immediate effect is always detrimental to the draught of the sledge; for not only does the individual that is struck draw back, and slacken his trace, but generally turns upon his next neighbor, and this passing on to the next, occasions a general divergency, accompanied by the usual yelping and showing of the teeth. The dogs then come together again by degrees, and the draught of the sledge is accelerated; but even at the best of times, by his rude mode of draught, the traces of one third of the dogs form an angle of thirty or forty degrees on each side of the direction in which the sledge is advancing. Another great inconvenience attending the Esquimaux method of putting the dogs to, besides that of not employing their strength to the best advantage, is the constant entanglement of the traces, by the dogs repeatedly doubling under from side to side, to avoid the whip; so that, after running a few miles, the traces always require to be taken off and cleaned.

"In directing the sledge, the whip acts no very essential part, the driver for this purpose using certain words, as the carters do with us, to make the dogs turn more to the right or left. To these a good leader attends with admirable precision, especially if his own name be repeated at the same time, looking behind over his shoulder with great earnestness, as if listening to the directions of the driver. On a beaten track, or even where a single foot or sledge mark is occasionally discernible, there is not the slightest trouble in guiding the dogs: for even in the darkest night, and in the heaviest snow-drift, there is little or no danger of their losing the road, the leader keeping his nose near the ground, and directing the rest with won

derful sagacity. Where, however, there is no beaten track, the best driver among them makes a terrible circuitous course, as all the Esquimaux roads plainly show ; these generally occupying an extent of six miles, when, with a horse and sledge, the journey would scarcely have amounted to five. On rough ground, as among hummocks of ice, the sledge would be frequently overturned, or altogether stopped, if the driver did not repeatedly get off, and by lifting or drawing it on one side, steer clear of those accidents. At all times, indeed, except on a smooth and well made road, he is pretty constantly employed thus with his feet, which, together with his never-ceasing vociferations, and frequent use of the whip, renders the driving of one of these vehicles by no means a pleasant or easy task. When the driver wishes to stop the sledge, he calls out, 'Wo, woa,' exactly as our carters do, but the attention paid to this command depends altogether on his ability to enforce it. If the weight is small and the journey homeward, the dogs are not to be thus delayed; the driver is therefore obliged to dig his heels into the snow to obstruct their progress, and having thus succeeded in stopping them, he stands up with one leg before the foremost cross-piece of the sledge, till, by means of laying the whip gently over each dog's head, he has made them all lie down. He then takes care not to quit his position, so that, should the dogs set off, he is thrown upon the sledge instead of being left behind by them.

"With heavy loads, the dogs draw best with one of their own people, especially a woman, walking a little way ahead; and in this case, they are sometimes enticed to mend their pace by holding a mitten to the mouth, and then making the motion of cutting it with a knife and throwing it on the snow, when the dogs, mistaking it for meat, hasten forward to pick it up. The women also entice them from the huts in a similar manner. The rate at which they travel depends, of course, on the weight they have to draw, and the road on which their journey is performed. When the latter is level, and very hard and smooth, constituting what, in other parts of North America, is called 'good sleighing,' six or seven dogs will draw from eight to ten hundred weight, at the rate of seven or eight miles an hour, for several hours together; and will easily, under these circumstances, perform a journey of fifty or sixty miles a day. On untrodden snow, five-and-twenty, or thirty miles, would be a good day's journey. The same number of well fed dogs, with a weight of five or six hundred, (that of the sledge included,) are almost unmanageable, and will, on a smooth road, run any way they please, at the rate of ten miles an hour. The work performed by a greater number of dogs, is, however, by no means in a proportion to this, owing to the imperfect mode already described of employing the strength of these sturdy creatures, and to the more frequent snarling and fighting occasioned by an increase of numbers."

THE NEWFOUNDLAND DOG.[1]

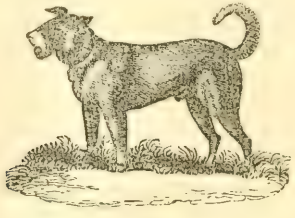
This animal, which came originally from the island whence it derives its name, has a remarkably pleasing countenance, is exceedingly docile, and of great size and sagacity. In their native country, they are extremely useful to the settlers on the coast, who employ them to bring wood from the interior. Three or four of them, yoked to a sledge, will draw three hundred weight of wood for several miles. In the performance of this task they are so expert as to need no driver. After having delivered their load, they will return to the woods with the empty sledge, and are then rewarded by being fed with dried fish.

The feet of this dog are more palmated than usual; which structure enables it to swim very fast, to dive easily, and to bring up any thing from the bottom of the water. It is, indeed, almost as fond of the water as if it were an amphibious animal. So sagacious is it, and so prompt in lending assistance, that it has saved the lives of numberless persons, who were on the point of drowning; and this circumstance, together with its uniform good temper, has justly rendered it a universal favorite.

THE MASTIFF.[2]

This species of dog is peculiar to England. It is nearly of the size of a Newfoundland dog, strong and active, possessing great sagacity, and is commonly employed as a watch dog. The mastiff is said seldom to use violence against intruders, unless resisted, and even then he will sometimes only throw down the person, and hold him for hours, without doing him further injury, till he is relieved. He has a large head, with short pendent ears, and thick lips hanging down on each side. In the reign of James I., a contest was exhibited between three mastiffs and a lion, in which the king of beasts was compelled to seek for safety in flight.

THE TERRIER[3]



Is a small, thick-set hound, of which there are two varieties; the one with short legs, long back, and commonly of a black or yellowish color, mingled

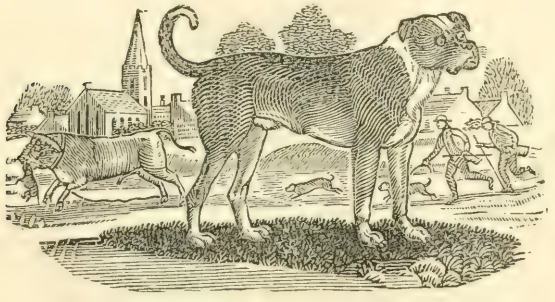
[1] *C. f. extrarius.* Sub-variety. [2] *C. Anglicus.* [3] *C. Britannicus.*

with white; the other more sprightly in appearance, with a shorter body, and the color reddish brown or black. It has a most acute sense of smelling, and an inveterate enmity to all kinds of vermin. Nor is it excelled by any dog in the quality of courage. It will encounter even the badger with the utmost bravery, though it often receives severe wounds in the contest, which, however, it bears with unshrinking fortitude. As it is very expert in forcing foxes and other game out of their coverts, and is particularly hostile to the fox, it is generally an attendant on every pack of hounds; in which case the choice of the huntsman is not directed by the size of the animal, but by its strength and power of endurance.

THE AUSTRALIAN DOG.[1]

This dog, which is also called the Australasian and New Holland dog, and by the natives, the *dingo*, is about equal in size, and similar in its proportions, to the common house dog, or lurcher. It is two feet five inches in length, muscular legged, agile, and courageous, with a bushy tail, and long, straight hair, of a deep fawn color on the upper parts, and almost white on the under surface. He is exceedingly voracious and fierce. One of them has been known to leap on the back of an ass, which was not saved from it without considerable difficulty.

THE BULL-DOG.[2]



Though much less in size than the mastiff, the bull-dog is nearly equal to him in strength, and superior to him in fierceness. Those of the brindled kind are accounted the best. No natural antipathy can exceed that of this animal against the bull. Without barking, he will naturally fly at and seize the fiercest bull; running directly at his head, and sometimes catching hold of his nose, he will pin the bull to the ground; nor can he, without

[1] *C. f. Australasiæ.* [2] *C. Molossus.*

great difficulty, be made to quit his hold. Such is his rage, that at a bull fight in the north of England, a brute in the shape of a man, wagered, that he would successively cut off the feet of his dog, and that the animal should return to the attack after each amputation. The horrible experiment was tried, and the wager was won. Two of these dogs, let loose, at once, are a match for a bull, three for a bear, and four for a lion.

THE SHEPHERD'S DOG.[1]

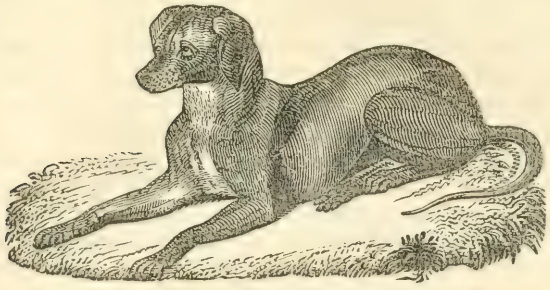
This dog is distinguished by his upright ears and sharp muzzle. His body is long, and covered with thick, woolly-like hair; his legs are rather short. All of his feet have one, and some of them two superfluous toes, which appear destitute of muscles, and hang dangling at the hind part of the leg. When properly trained, this dog becomes perfectly well acquainted with every individual sheep of his master's flock, and is of the greatest service to the pastoral inhabitants of the northern parts of Great Britain.

THE BLOOD-HOUND

Is a tall, beautifully formed animal, usually of a reddish or brown color, which was anciently in high esteem in England. His employ was to recover any game that had escaped wounded from the hunter, or had been stolen out of the forest; but he was still more serviceable in hunting thieves and robbers by their footsteps. For the latter purpose they are now almost disused in that country; but they are still sometimes employed in the royal forests to track deer stealers, and on such occasions they display an extraordinary sagacity and acuteness of scent. In the Spanish West India islands, however, they are constantly used in the pursuit of criminals, and are accompanied by officers called chasseurs.

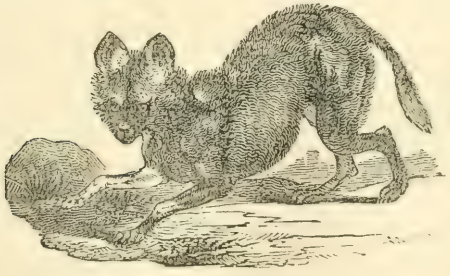
[1] *C. domesticus.*

THE AFRICAN BLOOD-HOUND.



Two males and a female of this species—a species which is remarkable for its elegance and its sagacity, were brought to England, from Africa, by Major Denham. While he was in that country he frequently employed them in hunting the gazelle; in performing which they displayed infinite skill. After a lapse of an hour and a half, or even two hours, they would follow the scent; and they would often quit the line of it, to cut off a double, or, in other words, to shorten the distance, and would recover it with the greatest ease. This dog is used in Africa to track a flying foe to his retreat. Captivity has rendered the female surly, and has deprived the whole of them of the desire to perpetuate their race.

THE HYÆNA DOG.[1]

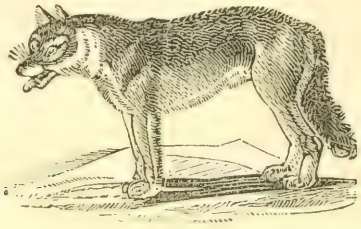


This dog is a native of Southern Africa, and is a serious nuisance to the frontier settlements at the Cape. It hunts in packs, generally at night, and is exceedingly fierce, swift, and active. Sheep, it unhesitatingly attacks, but it is less daring with respect to the horse and the ox, and, accordingly,

[1] *Canis pictus*, Desm.

it waits till the animal is asleep. The injuries which it inflicts are usually mortal. To bite off the tail of the ox seems to be its delight. The hyæna dog is smaller and slenderer than the hyæna, or the wolf. In color it is of a reddish or yellowish brown, variously mottled, along the sides of the body, and on the legs, in large patches of intermingled black and white. From its completely black nose and muzzle, a strong black line passes up the centre of the forehead to between the ears, which are very large, black on both surfaces, and furnished with a broad and expanded tuft of long, whitish hairs, filling a considerable part of their concavity. Its tail, of moderate length, is covered with long bushy hair, divided in the middle by a ring of black. Its ferocity seems to be untamable. Mr Burchell, who first carried it to England, kept one for twelve months, at the end of which period even its feeder did not dare to lay his hand upon it.

THE WOLF.[1]



The wolf, as well externally as internally, so nearly resembles the dog, that he seems modelled upon the same plan; and yet he only offers the reverse of the image. If his form be similar, his nature is different; and indeed they are so unlike in their dispositions, that no two animals can have a more perfect antipathy to each other. A young dog shudders at the sight of a wolf; a dog who is stronger, and who knows his strength, bristles up at the sight, testifies his animosity, attacks him with courage, endeavors to put him to flight, and does all in his power to rid himself of a presence that is hateful to him. They never meet without either flying from, or fighting with each other. If the wolf is the stronger, he tears and devours his prey; the dog, on the contrary, is more generous, and contents himself with his victory.

The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The wolf, when taken young, becomes tame, but never has an attachment. Nature is stronger in him than education; he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods whence he was taken. Cuvier, however

[1] *Canis lupus*, Lin.

gives a remarkable instance, in which a wolf manifested for his master all the devoted attachment of a dog. The gentleman who brought him up from a puppy, and who was going to travel, presented him to the Paris menagerie when he was full grown. For several weeks the wolf was inconsolable; but at length he contracted new attachments with those about him, and seemed to have forgotten his former owner. At the end of eighteen months, however, that owner returned, and, as soon as the wolf heard the well known voice in the gardens of the menagerie, he displayed the most violent joy, and, on being set at liberty, he hastened to his friend. An absence of three years next took place, and the wolf was again disconsolate. The master once more returned, and though, it being evening, the wolf's den was shut up, yet the moment the tones of his friend met his ear, he uttered the most anxious cries. On the door being opened, he darted towards the long absent person, leaped upon his shoulders, licked his face, and threatened to bite the keepers when they attempted to separate them. When the man left him, he fell sick, rejected all food, was long on the verge of death, and would thenceforth never suffer a stranger to approach him.

Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures; the wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great animal, such as a stag or a bull, or for destroying some formidable dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachment between the male and female; they seek each other only once a year, and remain but a few days together.

The difference in the duration of the pregnancy of the she wolf, who goes with young above a hundred days, and the bitch, who does not go above sixty, proves, that the wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal economy.

The wolf generally brings forth five or six, and sometimes even nine, at a litter. The cubs are brought forth, like those of the bitch, with the eyes closed. The dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. They do not leave the den where they have been littered, till they are six weeks or two months old. It is not, however, till they are about ten or twelve months old, and till they have shed their first teeth and completed the new, that the dam thinks them in a capacity to shift for themselves. Then, when they have acquired arms from nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny. These animals require two or

three years for their growth, and live to the age of fifteen or twenty years The body of the wolf is about three and a half feet long.

The wolf grows gray as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by day than night, and is always very easily waked. He drinks frequently; and in times of drought, when there is no water to be found in the trunks of trees, or in pools about the forest, he comes often, in the day, down to brooks or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

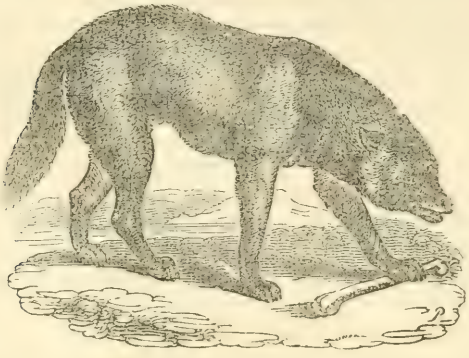
The wolf has great strength, particularly in his fore parts, in the muscles of his neck and jaws. He carries off a sheep in his mouth, without letting it touch the ground, and runs with it much swifter than the shepherds who pursue him, so that nothing but the dogs can overtake him, or oblige him to quite his prey. He bites cruelly, and always with greater vehemence in proportion as he is less resisted; for he uses precautions with such animals as attempt to stand upon the defensive. He is cowardly, and never fights but when under the necessity of satisfying his hunger, or of making good his retreat. When he is wounded by a bullet, he is heard to cry out; and yet, when surrounded by the peasants, and attacked with clubs, he never howls, but defends himself in silence, and dies as hard as he lived.

If he happens to be caught in a pit-fall, he is for some time so frightened and astonished, that he may be killed without offering to resist, or taken alive without much danger. At that instant, one may clap a collar round his neck, muzzle him, and drag him along, without his even giving the least signs of anger or resentment. At all other times, he has his senses in great perfection. He smells a carcass at the distance of more than a league; he also perceives living animals a great way off, and follows them a long time upon the scent. Whenever he leaves the wood, he always takes care to go out against the wind. When just come to its extremity, he stops to examine, by its smell, on all sides, the emanations that may come either from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he himself kills to those he finds dead; and yet he does not disdain these, though ever so much infected, when no better are to be had. He is particularly fond of human flesh; and, perhaps, if he were sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, choose to fall upon the shepherd rather than his flock, and devour women, carry off their children, &c.

The color of this animal differs according to the different climates in which he is bred, and often changes even in the same country. Besides the common wolves which are found in France and Germany, there are others

with thicker hair, inclining to yellow. In the northern climates, some are found quite black, and some white all over. The former are larger and stronger than those of any other kind.

THE CLOUDED BLACK WOLF.[1]



This animal is a native of the extreme northern regions of America. It is a much nobler looking creature than the common species, and is also much larger and more robust. The ears are remarkably short, and the tail is shorter in proportion than that of the wolf. The hair is mottled with various shades of black, gray, and white, and is of considerable length, particularly along the middle of the back and shoulders, where it forms a sort of ill defined mane. On the sides the coloring is somewhat lighter, and is of a still lighter shade beneath. From the top of the nose to the origin of the tail, this animal measures about four feet and a quarter. Its ferocity remains undiminished by protracted confinement.

THE AMERICAN WOLF.

The common wolf of America is considered to be the same species as the wolf of Europe, and, in regard to habits and manners, gives every evidence of such an identity.*

[1] *Canis Lycaon*, Lin.

* Richardson remarks that he has travelled over thirty degrees of latitude in America, and has never seen there any wolves which had the gaunt appearance, the comparatively long jaw and tapering nose, the high ears, long legs, slender loins, and narrow feet of the Pyrenean wolf. He adds, that the American animal has a more robust form than the European wolf. Its muzzle is thicker and more obtuse, its head larger and rounder, and there is a sensible depression at the union of the nose and forehead. He notices six varieties of the wolf in North America:—common gray wolf, white, pied, dusky, black, and prairie. There is little reason to doubt that all the wolves of America are of one species; and the variations of size, color, and habits, are to be referred to diversities of climate which have been gradually impressed upon these animals.

Like all the wild animals of the dog kind, they unite in packs to hunt down animals which individually they could not master, and, during their sexual season, engage in the most furious combats with each other for the possession of the females.

In the regions west of Hudson's Bay, wolves are often seen, both in the woods and on the plains, though their numbers are inconsiderable, and it is not common to see more than three or four in a pack. They appear to be very fearful of the human race, but are destructive to the Indian dogs, and frequently succeed in killing such as are heavily laden, and unable to keep up with the rest. The males are not so swift as the females; and they seem to lead a forlorn life during the winter, being seldom seen in pairs until the commencement of spring. They bring forth their young in burrows, and though it might well be inferred that they are fiercer at those times, than under ordinary circumstances, yet Hearne states that he has frequently seen the Indians take the young ones from the dens and play with them. They never hurt the young wolves, but always replace them in their dens, sometimes painting the faces of these whelps with vermilion or red ochre.

At the highest northern latitudes which have yet been explored, the wolves are very numerous and very audacious. They are generally to be found at no great distance from the huts of the Esquimaux, and follow these people from place to place, being apparently very much dependent upon them for food, during the coldest season of the year. They are frequently seen in packs of twelve or more, prowling about at a short distance from the huts of the Esquimaux, lying in wait for the Esquimaux dog, which they are successful in killing, if he wanders so far as to be out of reach of assistance from his master.

When the aboriginal Americans first gave place to European adventurers, and the forests, which had flourished for ages undisturbed, began to fall before the unsparing axe, the vicinity of the settler's lonely cabin resounded with the nightly howling of wolves, attracted by the refuse provision usually to be found there, or by a disposition to prey upon domestic animals During winter, when food was most difficult to be procured, packs of these famished and ferocious creatures were ever at hand, to run down and destroy any domestic animal found wandering beyond the enclosures, which their individual or combined efforts could overcome, and the boldest housedog could not venture far from the door of his master without incurring the risk of being killed and devoured. The common wolf was then to be found in considerable numbers throughout a great extent, if not the whole of North America; at present, it is only known as a resident of the remote wooded and mountainous districts.

THE PRAIRIE, OR BARKING WOLF.[1]

This wolf frequents the prairies or natural meadows of the west, where troops or packs, containing a considerable number of individuals, are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other wolves which are found in North America.

The barking wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity, and strength to succeed in this chase. They are very often exposed to great distress from want of food, and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

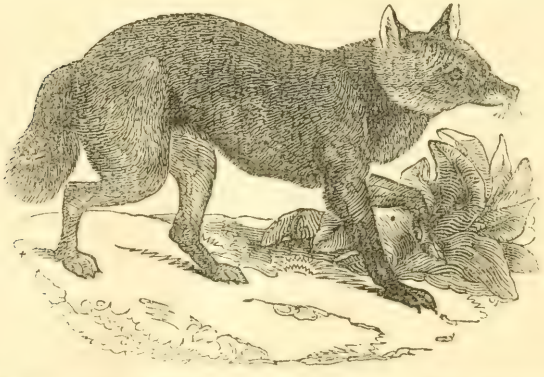
In confirmation of the sagacity of this wolf, we shall quote from Say, to whom we owe all that has yet been made known on this species some anecdotes respecting it. "Mr Peale constructed and tried various kinds of traps to take them, one of which was of the description called a 'live trap,' a shallow box reversed and supported at one end by the well known kind of trap-sticks usually called the 'figure four,' which elevated the front of the trap upwards of three feet above its slab flooring; the trap was about six feet long, and nearly the same in breadth, and was plentifully baited with offal. Notwithstanding this arrangement, a wolf actually burrowed under the flooring, and pulled down the bait through the crevices of the floor.

[1] *Canis latrans*, Say.

tracks of different size were observed about the trap. This procedure would seem to be the result of a faculty beyond mere instinct.

"This trap proving useless, another was constructed in a different part of the country, formed like a large cage, through which the animals might enter, but not return; this was equally unsuccessful; the wolves attempted in vain to get at the bait, as they would not enter by the route prepared for them. A large double 'steel trap' was next tried; this was profusely baited, and the whole, with the exception of the bait, was carefully concealed beneath the fallen leaves. This was also unsuccessful. Tracks of the anticipated victims were next day observed to be impressed in numbers on the earth near the spot, but still the trap with its seductive charge remained untouched. The bait was then removed from the trap, and suspended over it from the branch of a tree; several pieces of meat were also suspended in a similar manner from trees in the vicinity. The following morning the bait over the trap alone remained. Supposing that their exquisite sense of smell warned them of the position of the trap, it was removed and then covered with leaves, and the baits being disposed as before, the leaves to a considerable distance around were burned; and the trap remained perfectly concealed by ashes; still the bait over the trap was avoided. It was not until a log trap was used that an individual of this species was caught. This log trap is made by raising one log above another at one end by means of an upright stick, which rests upon a rounded horizontal trigger on the lower log."— *Godman*.

THE JACKAL[1]



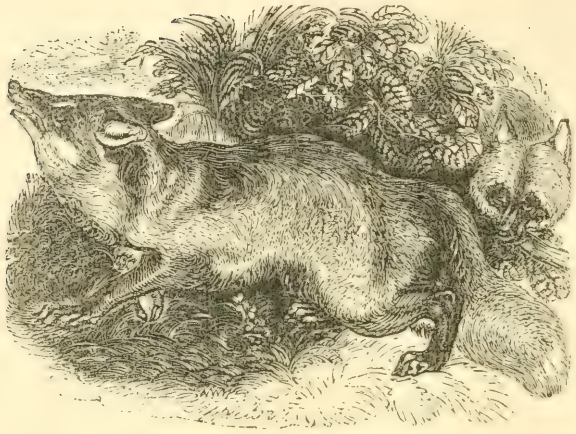
Is one of the commonest wild animals in the east, yet there is scarcely any one less known in Europe, or more confusedly described by naturalists. It

[1] *C. aureus* Lin.

inhabits the warmer parts of the old continent, and seems to occupy the place of the wolf, which is not there so common. "In size," says Mr Bennett, "he is about equal to the common fox, but he differs from that equally troublesome animal in the form of the pupils of his eyes, which correspond with those of the dog and of the wolf; in the comparative shortness of his legs and muzzle; in his less tufted and bushy tail; and in the peculiar marking of his coat. The coloring of his back and sides consists of a mixture of gray and black, which is abruptly and strikingly distinguished from the deep and uniform tawny of his shoulders, haunches, and legs; his head is nearly of the same mixed shade with the upper surface of his body, as is also the greater part of his tail, which latter, however, becomes black towards its extremity; his neck and throat are whitish, and the under surface of his body is distinguished by a paler hue." The yellow which is about him is the reason why many authors have called the jackal the *golden wolf*.

As the species of the wolf approaches that of the dog, so the jackal finds a place between them both. The *jackal*, or *adil*, as Belon says, *is a beast between the wolf and the dog*. To the ferocity of the wolf, it joins, in fact, a little of the familiarity of the dog. Its voice is a kind of a howl, mixed with barking and groaning; it is more noisy than the dog, and more voracious than the wolf; it never stirs out alone, but always in packs, of twenty, thirty or forty; they collect together every day, to go in search of their prey; they make themselves formidable to the most powerful animals, by their number; they attack every kind of beasts or birds, almost in the presence of the human species; they abruptly enter stables, sheepfolds, and other places, without any sign of fear; and when they cannot meet with any other thing, they will devour boots, shoes, harnesses, &c., and what leather they have not time to consume they take away with them. When they cannot meet with any live prey, they dig up the dead carcasses of men and animals. The natives are obliged to cover the graves of the dead with large thorns, and other things, to prevent them from scratching and digging up the dead bodies. The dead are buried very deep in the earth; for it is not a little trouble that discourages them. Numbers of them work together, and accompany their labor with a doleful cry; and, when they are once accustomed to feed on dead bodies, they run from country to country, follow armies, and keep close to the caravans. This animal may be styled the crow of quadrupeds; for they will eat the most putrid or infectious flesh; their appetite is so constant and so vehement, that the driest leather is savory to them; and skin, flesh, fat, excrement, or the most putrefied animal, is alike to their taste.

THE FOX[1]



Is one of the most widely distributed animals, and is found in all the temperate and northern regions of the old and new world. With one exception, the structure of the eye, the organization of the fox and dog are similar. Hence the fox preys by night. He has always been famous for his cunning; he generally fixes his residence at the edge of a wood, and yet not far removed from some cottage or some hamlet. He listens to the crowing of the cock, and the cackling of other domestic fowls: even at a considerable distance he scents them, and seizes his opportunity. If he be able to get into the yard, he begins by levelling all the poultry without remorse. This done, he carries off a part of the spoil, hides it at some convenient distance, and again returns to the charge. Taking off another fowl in the same manner, he hides that also, though not in the same place; and this method he practises for several times together, till warned by the approach of day, or the noise of the family, he finally retires. The same arts are observed when he finds birds entangled in springs laid for them by the fowler; with whom the fox, taking care to be beforehand, very expertly snatches the birds out of the snare, conceals them in different places, leaves them there sometimes for two or three days, and is never at a loss to recover his hidden treasure. He is equally alert in seizing the young hares and rabbits, before they have strength enough to escape him; and when the old ones are wounded and fatigued, he is sure to come upon them in the moments of distress, and to show them no mercy. In the same manner he finds out the nests of the partridge and the quail, and seizes the mother while sitting.

[1] *C. vulpes*, Lin.

The fox is so voracious, that, when deficient of better food, he devours rats, mice, lizards, toads, and serpents. Insects and shell-fish he is likewise sometimes known to eat. In vain does the hedgehog roll itself up into a ball to oppose him: this determined glutton teases it till it is obliged to appear uncovered, and then devours it. The wasp and the wild bee are attacked by him with equal success. Though at first they fly out upon their invader, and actually oblige him to retire, yet this repulse is but for a few minutes, till he has rolled himself upon the ground, and thus crushed such as may have stuck to his skin: he then returns to the charge, and at length, by dint of perseverance, obliges them to abandon their combs, which he greedily devours, both wax and honey.

The young foxes are born blind, like dogs; like them, too, they are eighteen months or two years in coming to perfection, and live about thirteen or fourteen years. They are nursed with great affection by the mother, who has been known to run with them in her mouth several miles when hunted. The senses of the fox are as good as those of the wolf; his scent is more acute, and the organ of his voice is more supple and more perfect. The wolf is never heard but by dreadful howls, while the fox only yelps, barks, and sends forth a mournful sound, resembling the cry of the peacock. His tones, too, are different, according to the different sentiments with which he is affected. He has one sound expressive of desire, another of murmur, another of sorrow, and another of pain: the latter is never heard from him, unless in the instant that he is wounded by shot, and has lost the use of some member; for, like the wolf, when attacked with cudgels alone, he never murmurs, but will defend himself with obstinacy, and fight in silence to the last gasp. He bites dangerously, and with such determined fury, that, in order to make him relinquish his hold, ponderous wooden and even iron bars are necessary to be forced between his jaws.

The flesh of the fox is not so bad as the flesh of the wolf. Dogs, and even men, eat it in autumn, especially if the animal has fed on grapes; and, in winter, good furs are made of his skin. He sleeps so sound, that, however closely approached, there is no great danger of awaking him. When he only means to rest himself, he stretches out his hind legs, and remains flat on his belly. In this posture he watches for the birds as they perch on the hedges; who no sooner perceive him, than they give each other warning of their approaching danger. The jackdaw and the magpie, in particular, often follow him along to the distance of some hundred paces, still towering beyond his reach, and, with their cries and notes of hostility, apprise other animals to beware.

Of all wild animals, the fox is most subjected to the influence of climate, and there are found nearly as many varieties in this species, as in that of any domestic animal. The generality of foxes in Europe are red; of some, however, the hair is of a grayish cast; and, of all, the tip of the tail is white In the northern countries foxes of all colors are found.

THE ARCTIC FOX,[1]

In its full winter dress, is entirely of a pure white color, except at the tip of the tail, where there are a few black hairs intermixed. Before the eyes, and on the lower jaw, the hair is short and sleek; on the posterior part of the cheeks, and on the forehead, it becomes longer, and on the occiput and neck it equals the ears in length, and is intermixed with soft wool. There is so much wool on the body, that it gives the fur the character of that of the American hare. In the months of April and May, when the snow begins to disappear, the long white fur falls off, and is replaced by shorter hair, more or less colored. The head and chin are then brown, having some fine white hairs scattered through the fur. A similar brown color extends along the back to the tail, and down the outside of all the legs; the under parts of the body being of a dingy white.

The perfect similarity of habits, and the series of variations in their fur, may lead us to conclude that the arctic foxes of the New and Old World are of the same species. They are inhabitants of the most northern lands hitherto discovered, and in North America they are numerous, on the shores of Hudson's Bay, north of Churchill, and exist also in Bhering's Straits.

The brown variety of the Arctic fox breeds on the sea-coast, within the Arctic circle. They form burrows in sandy spots in little villages, twenty or thirty burrows being constructed adjoining each other. Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast.

Captain Lyon, who has studied the manners of the Arctic fox with attention, says, "that it bears a great resemblance to the European species, though it is considerably smaller. The general time of rest is during the daylight, in which they appear listless and inactive, but the night no sooner sets in, than all their faculties are awakened: they commence their gambols, and continue in unceasing and rapid motion till morning. Their bark is so modulated, as to give you an idea that the animal is at a distance, although at the very moment he lies at your feet. They feed on eggs, young birds, blubber, and carrion of any kind; but their principal food seems to be lemmings of different species. A confinement of a few hours often sufficed to quiet one of them; and some instances have occurred of their being perfectly tame although timid, from the first moment of their captivity. Their fur is of small value in commerce."

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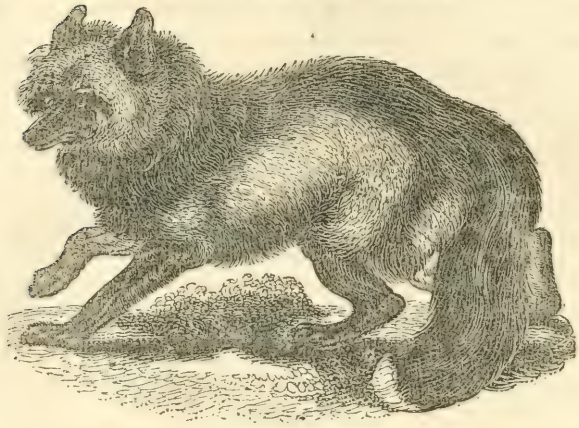
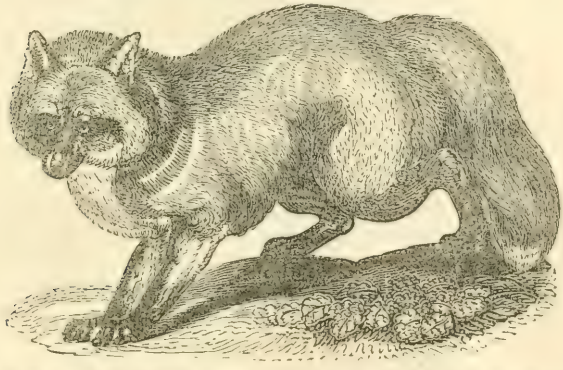
[1] *C. lagopus*, Lin.

THE SILVERY FOX.[1]



This animal is very rare, a greater number than four or five being seldom taken in a season in the fur countries. The fur is six times the value of any other fur produced in North America. It is sometimes found of a shining black, the tip of the tail being white. It is commonly found of a black color, intermixed with hairs tipped with white. It inhabits the same districts with the red fox. It is not yet clearly proved that it is of the same species as the black fox of Europe, though it bears a strong resemblance to it.

THE AMERICAN FOX.[2]



The common fox of America is supposed by Cuvier to be a distinct species from the red fox of Europe. It inhabits all parts of the United States. It

[1] *C. argentatus*, Desm.

[2] *C. fulvus*, Desm.

is of a bright red color on the head, back, and sides; on the throat and neck of a dark gray; and pale red on the under parts of the body. It bears a strong resemblance to the common European fox, but differs from it in the breadth and capacity of its feet for running on the snow; and the quantity of long hair, clothing the back part of the cheeks, with the shorter ears and nose, give the head a more compact appearance. It has a much finer brush than the European one, and is altogether a finer animal. It is very plentiful in the wooded district of the fur countries, about eight thousand being annually imported into England from thence.

Red foxes prey much on the smaller animals of the rat family, but they are fond of fish, and reject no kind of animal food that comes in their way. They hunt their food chiefly in the night, though they are frequently seen in the daytime. They are taken in steel traps, but much nicety is required in setting them, as the animal is very suspicious.

THE FENNEC.[1]

This beautiful and extraordinary animal, or at least one of this genus, was first made known to European naturalists by Bruce, who received it from his dragoman, whilst consul general at Algiers. Bruce kept it alive for several months. Its favorite food was dates, or any other sweet fruit; it was also very fond of eggs; when hungry it would eat bread, especially with honey or sugar. His attention was immediately attracted if a bird flew near him, and he would watch it with an eagerness that could hardly be diverted from its object: but he was dreadfully afraid of a cat, and endeavored to hide himself, the moment he saw an animal of that species, though he showed no symptoms of preparing for any defence. Bruce never

[1] *C. Brucei*, Buff.

heard that he had any voice. During the day he was inclined to sleep, but became restless and exceedingly unquiet as night came on.

Bruce describes his fennec as about ten inches long, and of a dirty white color; the hair on the belly being softer, whiter, and longer than on the rest of the body.

There has been great diversity of opinion among naturalists concerning this animal. Cuvier treats Bruce's account as scarcely worthy of credit but Denham and Clapperton, on their return from Central Africa, brought a skin of the animal, and thus placed its existence beyond doubt.

THE CIVET[1]

Is from two to three feet in length, stands from ten to twelve inches high, and has a tail half the length of its body. The hair is long, and the ground color of it is a brownish gray, interspersed with numerous transverse, interrupted bands or irregular spots of black. Along the centre of the back, from between the shoulders to the end of the tail, is a kind of mane, which can be erected or depressed as the animal pleases, and which is formed of black hairs, longer than those of the body. The sides of the neck and the upper lip are nearly white. The legs, and the greater part of the tail,

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[1] *Viverra civetta*, L'N. The genus *Viverra* has six upper and six lower incisors; two upper and two lower canines; twelve upper and twelve lower molars. Three false molars in the upper jaw, conical and compressed, a large carnivorous bicuspid tooth, and two tuberculous ones; in the lower, four false molars, one bicuspid and one tuberculous; head long; muzzle pointed; feet pentadactyle; claws semiretractile; anal pouch more or less deep.

are perfectly black; there is a large, black patch round each eye, which passes thence to the corner of the mouth; and two or three bands of the same color stretch obliquely from the base of the ears towards the shoulders and neck, the latter of which is marked with a black patch.

The perfume of the civet is very strong; and though the odor is so strong, it is yet agreeable, even when it issues from the body of the animal. The perfume of the civet we must not confound with musk, which is a sanguineous humor, obtained from an animal altogether different from either the civet or the zibet.

The civets, though natives of the hottest climates of Africa and of Asia, are yet capable of living in temperate, and even in cold countries, provided they are carefully defended from the injuries of the air, and provided with delicate and esculent food. In Holland, where no small emolument is derived from their perfume, they are frequently reared. The perfume of Amsterdam is esteemed preferable to that which is brought from the Levant, or the Indies, which is generally less genuine. That which is imported from Guinea, would be the best of any, were it not that the negroes, as well as the Indians and the people of the Levant, adulterate it with mixtures of laudanum, storax, and other balsamic and odorous drugs.

Those who breed these animals for the sake of their perfume, put them into a long and narrow sort of box, in which they cannot turn. This box the person who is employed to collect the perfume, opens behind, for this purpose, twice or thrice a week; and, dragging the animal which is confined in it, backward by the tail, he keeps it in this position by a bar before. This done, he takes out the civet with a small spoon, carefully scraping with it, all the while, the interior coats of the pouch under the tail, which secretes and contains it. The perfume thus obtained, is put into a vessel, and every care is taken to keep it closely shut.

The quantity which a single animal will afford, depends greatly upon its appetite, and the quality of its nourishment. It yields more in proportion as it is more delicately and abundantly fed. Raw flesh hashed small, eggs, rice, small animals, birds, young fowls, and particularly fish, are the food in which the civet most delights.

As to the rest, the civet is a wild, fierce animal, and, though sometimes tamed, is yet never thoroughly familiar. Its teeth are strong and sharp; but its claws are feeble and blunt. It is light and active, and lives by prey, pursuing birds, and other small animals, which it is able to overcome. It generally attacks at night, and by surprise. They are sometimes seen stealing into yards and out-houses, like the fox, in order to carry off poultry. Their eyes shine in the night; and it is very probable that they see better by night than by day. When they fail of animal food, they are found to subsist upon roots and fruits. They very seldom drink; nor do they ever inhabit humid ground; but in burning sands, and in arid mountains, they cheerfully remain. There is another animal called

THE ZIBET,[1]

Which differs from the civet, in having a body longer and less thick, a snout flatter, more slender, and somewhat concave at the upper part; its hair is much shorter and softer; it has no mane, no black under the eyes, or upon the cheeks. All these characteristics are peculiar to, and very remarkable in, the civet

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THE JAVANESE CIVET[2]

Differs considerably from the common civet. The body, narrow, compressed, and higher behind than before, is from fifteen to eighteen inches long. The back is strongly arched. The muzzle is narrow and tapering; the ears short and rounded; the profile forms a perfectly straight line; the tail, tapering gradually to the tip, is as long as the body, and is marked with eight or nine broad, black rings, which alternate with as many of a grayish hue. A much lighter gray than that of the civet composes the ground color; there is a broad, longitudinal dorsal line of black, and on each side two or three narrower black lines, consisting of confluent spots. Over the rest of the body these spots are thickly but rather irregularly scattered, so as to constitute a series of flexuous, dotted lines. The side of the neck above is occupied by a deep, longitudinal black line, and, below, there is a second, which is more obliquely placed. The head is grayish, and has no spots; and the legs are externally black.

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[1] *V. zibetha*, Lin.

[2] *V. Rasse*, Horsf.

THE GENET[1]

Is an animal smaller than the civets. It has a long body, short legs, a sharp snout, and a slender head. Its fur, which is exceedingly smooth and soft, is of an ash color, glossy, and marked with black stripes, which are separate upon the sides, but which unite upon the back. It has, also, upon the neck, a kind of mane, or longish hair, which forms a black streak, from the head to the tail, which last is as long as the body, and is marked with seven or eight rings, from the insertion to the tip, which are alternately black and white.

The genet has under the tail, and in the very same place with the civets, an opening, or pouch, in which is separated a kind of perfume resembling civet, but less strong, and apt sooner to evaporate. It is an animal somewhat larger than the marten, which it strongly resembles, not only in the form of the body, but also in disposition and habit, and from which it seems chiefly to differ in being more easily tamed. It is a native of Spain, Africa, and the south of Asia.

THE ICHNEUMON,[2]

From the tip of the nose to the end of the tail, is from twenty-four to forty-two inches in length; nearly half of which is occupied by the tail. At the base, the tail is very thick; it tapers gradually towards the point, which is

[1] *V. Genetta*, Lin.

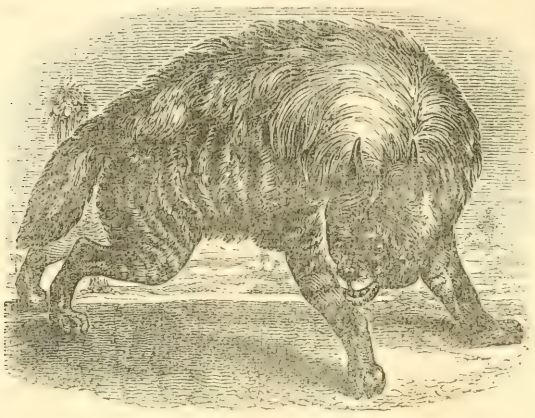
[2] *Herpestes Pharaonis*. The genus *Herpestes* has six upper and six lower incisors; two upper and two lower canines; ten upper and ten lower molars. Body elongated; anal pouch large; feet pentadactyle, semi-palmated, with nails partly retractile.

slightly tufted. The eyes are of a bright red; the ears almost naked, small and rounded; the nose is long and slender. The legs are short. The hair is hard and coarse, and of a pale reddish gray, each hair being mottled with brown or mouse color.

This animal is domestic in Egypt, like our cat; and, like that, is serviceable in destroying rats and mice; but its inclination for prey and its instinct are much stronger and more extensive than the cat's; for it hunts alike, birds, quadrupeds, serpents, lizards, and insects. It attacks every living creature in general, and feeds entirely on animal flesh: its courage is equal to the sharpness of its appetite; it is neither frightened at the anger of the dog, nor the malice of the cat, nor even dreads the bite of the serpent. It pursues them with eagerness, and seizes on them, however venomous they may be. As soon as it begins to feel the impressions of their venom, it immediately goes in search of antidotes, and particularly a root that the Indians call by its name, and which, they say, is one of the most powerful remedies in nature against the bite of the viper. It sucks the eggs of the crocodile, as well as those of fowls and birds; it also kills and feeds on young crocodiles, when they are scarcely come out of their shell; and, as fable commonly accompanies truth, it has been currently reported, that, by virtue of this antipathy, the ichneumon enters the body of the crocodile, when it is asleep, and never quits it till he has devoured its entrails. It was formerly deified by the Egyptians, for its serviceable qualities.

It lives commonly by the sides of rivers, inundations, and other waters, and is reported to swim and dive occasionally, like an otter, and to remain for a considerable time beneath the liquid element. It quits its habitation to seek its prey near habitable places. It sometimes carries its head erect, fore-shortens its body, and raises itself upon its hind legs; at other times, it creeps and lengthens itself like a serpent: it often sits upon its hind feet, and often springs upon its prey: its eyes are lively and full of fire. Its aspect is beautiful, the body very active, the legs short, the tail thick and very long, and the hair rough and bristly. Both male and female have a remarkable orifice, independent of the natural passages. It is a kind of pocket, into which an odoriferous liquor filters. They pretend that it opens this bag, or pocket, to refresh itself when too hot. Its nose is very sharp, and its mouth narrow, which prevents it from seizing and biting any thing very large; but this defect is amply supplied by its agility, courage, and by its power. It very easy strangles a cat, although much larger and stronger than itself; it often fights with dogs, and, of whatever size they are, it commonly gets the better of them. It may easily be domesticated, and is then more tame, obedient, and affectionate than a cat.

THE STRIPED HYÆNA.[1]



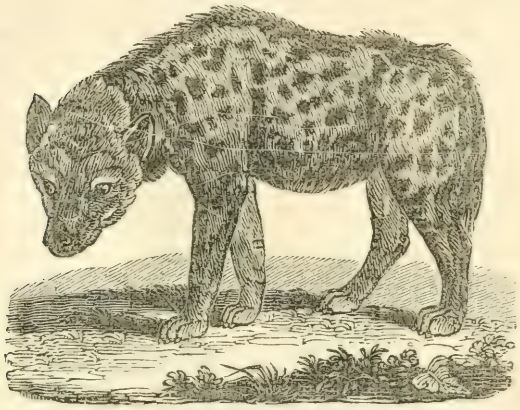
So striking, and even so singular, are the characteristics of the hyæna, that it is hardly possible to be deceived by them. It is, perhaps, the only quadruped which has but four toes to either the fore or hind feet: like the badger, it has an aperture under the tail, which does not penetrate into the interior parts of the body; its ears are long, straight, and nearly bare; its head is more square and shorter than that of the wolf; its legs, the hind ones especially, are longer; its eyes are placed like those of the dog; the hair and mane of a brownish gray, with transverse dark brown or blackish bands on the body, which stripes become oblique on the flanks and the legs. The coat is of two sorts; fur or wool, in small quantity, and long, stiff, and silky hair. Its height varies from nineteen to twenty-five inches, and its usual length, from the muzzle to the tail, is three feet three inches.

The striped hyæna is a native of Barbary, Egypt, Abyssinia, Nubia, Syria, Persia, and the East Indies. It generally resides in the caverns of mountains, in the clefts of rocks, or in dens, which it has formed for itself under the earth. It lives by depredation, like the wolf; but it is a stronger animal, and seemingly more daring. It sometimes attacks man, carries off cattle, follows the flocks, breaks open the sheepcotes by night, and ravages with a ferocity insatiable. By night also its eyes shine; and it is maintained that it sees better than in the day. If we may credit all the naturalists who have treated of this animal, its cry is very peculiar, beginning with something like the moaning of a human being, and ending in a sound which resembles the sobs or reachings of a man in a violent fit of vomiting;

[1] *Hyæna vulgaris*. The genus *Hyæna* has six upper and six lower incisors; two upper and two lower canines; ten upper and eight lower molars. Feet tetradactyle; nails not retractile; legs long; eyes projecting; ears large; a glandular pouch at the anus.

but, according to Kæmpfer, who was an ear-witness of the fact, it sounds like the lowing of a calf. When at a loss for other prey, it scrapes up the earth with its feet, and devours the carcasses both of animals and men, which, in the countries that it inhabits, are interred promiscuously in the fields.

THE SPOTTED HYÆNA.[1]



This animal is a native of Southern Africa, and abounds in the neighborhood of the Cape of Good Hope, where it is called the tiger wolf. It is somewhat inferior in size to the striped hyæna, but, in its wild state, has the same manners and propensities. Its short muzzle is less abruptly truncated, and its ears, short and broad in form, are of a nearly quadrilateral figure. The general color of the hide is a dirty yellow, or yellowish brown, and the whole body is covered with spots of a blackish brown, excepting the under part of the belly and of the breast, the inner surface of the limbs and the head. The muzzle is black, and the tail covered with long bushy hair of a blackish brown. Like the striped hyæna, the spotted species has jaws of enormous strength, with which it easily breaks to pieces the hardest bones.

It is a common but erroneous idea, that the hyæna is wholly savage and untamable. Both species have been tamed, and instances are recorded of individuals having manifested all the attachment of a dog. The striped hyæna has recently been domesticated in the Cape territory, and is considered one of the best hunters after game, and as faithful and diligent as any of the common domestic dogs. The truth is, that the hyæna has a very

[1] *H. capensis*, Desm.

natural aversion to close confinement, and when exhibited, as he generally is, in a narrow cage, he is miserable, and consequently irritable. In a man, similarly situated, the expression of anger would be praised as a generous hatred of slavery.

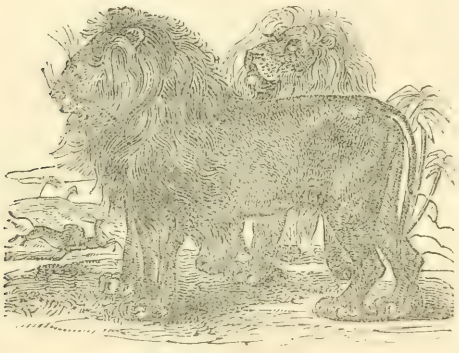
The hyæna was undoubtedly once an inhabitant not only of the European continent, but also of the British islands. His bones have been found in various parts of England and Wales, and particularly in a cave at Kirby Moorside, in Yorkshire.

The depredations of the hyæna are not confined to the remains of the dead. There are periods when they become bold from extreme hunger, and will carry off very large animals, and even human beings, with the most daring ferocity. Major Denham says, "at this season of the year," (August,) "there are other reasons, besides the falls of rain, which induce people to remain in their habitations. When the great lake overflows the immense district which, in the dry season, affords cover and food, by its coarse grass and jungle, to the numerous savage animals with which Bornou abounds, they are driven from these wilds, and take refuge in the standing corn, and sometimes in the immediate neighborhood of the towns. Elephants had already been seen at Dowergoo, scarcely six miles from Kouka, and a female slave, while she was returning home, from weeding the corn, to Kowa, not more than ten miles distant, had been carried off by a lioness. The hyænas, which are every where in legions, grew now so extremely ravenous, that a good large village, where I sometimes procured a draught of sour milk on my duck-shooting excursions, had been attacked the night before my last visit, the town absolutely carried by storm, notwithstanding defences nearly six feet high of branches of the prickly tulloh, and two donkies, whose flesh these animals are particularly fond of, carried off, in spite of the efforts of the people. We constantly heard them close to the walls of our town at night; and on a gate being left partly open, they would enter and carry off any unfortunate animal that they could find in the streets."

With this strong desire for food, approaching to the boldness of the most desperate craving, the hyæna, although generally fearful of the presence of man, is an object of natural terror to the African traveller. Bruce relates, that one night in Maibsha, in Abyssinia, he heard a noise in his tent, and, getting up from his bed, saw two large blue eyes glaring upon him. It was a powerful hyæna, who had been attracted to the tent by a quantity of candles, which he had seized upon, and was bearing off in his mouth. He had a desperate encounter with the beast, but succeeded in killing him. In the neighborhood of the ruins of those cities on the northern coast of Africa, which, in ancient times, were the abodes of wealth and splendor, and witnessed the power of the Ptolemies and Cæsars, the hyæna is a constant resident, and increases the sense of desolation by the gloominess of his habits. At Ptolemeta, where there are many remains of former architectural

magnificence, the fountains which were constructed for the accommodation of an enormous population are now useless, except to the wandering Arab, and to the jackal and hyæna, who stray amongst these ruins after sunset, to search for water at the deserted reservoirs. Seldom does the hyæna molest the traveller in these solitudes; but his howl, or the encounter of his fierce and sullen eye, is always alarming. Captain Beechey says, "although we had very frequently been disturbed by hyænas, we never found that familiarity with their howl, or their presence, could render their near approach an unimportant occurrence; and the hand would instinctively find its way to the pistol, before we were aware of the action, whenever either of these interruptions obtruded themselves closely upon us, either by night or by day." Such encounters are generally without any fatal results, if the man does not commence the attack. The hyæna sets up a howl, and doggedly walks away, with his peculiar limping motion, which gives him an appearance of lameness, but when he is attacked, his resistance is as fierce as it is obstinate.

THE LION.[1]



THE outward form of the lion seems to speak the superiority of his internal qualities. His figure is striking, his look confident and bold, his gait proud, and his voice terrible. His stature is not overgrown, like that of the elephant, or the rhinoceros; nor is the shape clumsy, like that of the hippopotamus, or the ox. He is in every respect compact and well-proportioned, a perfect model of strength joined with agility.

[1] *Felis Leo*, LIN. The genus *Felis* has six upper and six lower incisors; two upper and two lower canines; eight or six upper and six lower molars; five toes on the fore feet hind feet tetradactyle; nails retractile; head short; four molars on each side of the upper jaw, the last tuberculous and very small; three in the lower jaw; ears pointed.

His force and muscular power he manifests outwardly by his prodigious leaps and bounds; by the strong and quick agitation of his tail, which alone is sufficient to throw a man on the ground; by the facility with which he moves the skin of his face, and particularly that of his forehead, which adds greatly to his physiognomy, or rather to the expression of fury in his countenance; and lastly, by the facility he has of shaking his mane, which is not only bristled up, but moved and agitated on all sides, when he is enraged.

The largest lions are about eight or nine feet in length, from the snout to the insertion of the tail, which is of itself four feet long; and these large lions are about four or five feet in height. Those of the small size are about five feet and a half in length, and three and a half in height. In all her dimensions, the lioness is about one fourth less than the lion.

The lion is furnished with a mane, which becomes longer in proportion as he advances in age. The lioness, however, is without this appendage at every age.

Both the ancients and the moderns allow that the lion, when newly born, is in size hardly superior to a weasel; in other words, that he is not more than six or seven inches long; and if so, some years at least must necessarily elapse before he can increase to eight or nine feet. They likewise mention, that he is not in a condition to walk till two months after he is brought forth; but, without giving entire credit to these assertions, we may, with great appearance of truth, conclude that the lion, from the largeness of his size, is at least three or four years in growing, and that, consequently, he must live seven times three or four years, that is, about twenty-five years.

It is usually supposed that the lion is not possessed of the sense of smelling in such perfection as most other animals of prey. It is also remarked that too strong a light incommodes him; that he seldom goes abroad in the middle of the day; that he commits all his ravages in the night; and that when he sees a fire kindled near a herd or flock, he will not venture near it; that though his sight is bad, it is not, however, so faulty as his smell; and that, unlike the dog or the wolf, he rather hunts by the former than by the latter.

The lion, when hungry, boldly attacks all animals that come in his way; but, as he is very formidable, and as they all seek to avoid him, he is often obliged to hide, in order to take them by surprise. For this purpose he crouches upon his belly, in some thicket, or among the long grass, which is found in many parts of the forest. In this retreat he continues, with patient expectation, until his prey comes within a proper distance; and he then springs after it with such force, that he often seizes it at the first bound. If he misses the effort, and in two or three reiterated springs cannot seize his prey, he continues motionless for a time, seems to be very sensible of his disappointment, and waits for a more favorable opportunity. He devours a great deal at a time, and generally fills himself for two or three days to come. His teeth are so strong that he very easily breaks the bones, and swallows them with the rest of the body. It is reported that he sustains

hunger a very long time; but thirst he cannot support in an equal degree, his temperament being extremely hot. He drinks as often as he meets with water, lapping like a dog. He generally requires about fifteen pounds of raw flesh in a day; and seldom devours the bodies of animals when they begin to putrefy; but he chooses rather to hunt for fresh spoil than return to that which he had half devoured before. While young and active, the lion subsists on what he can obtain by the chase, and seldom quits his native deserts and forests; but when he becomes old, heavy, and less qualified for exercise, he approaches the habitations of man, to whom, and to domestic animals, he then becomes a more dangerous enemy. It is observed, however, that when he sees men and animals together, it is always on the latter, never on the former, that he vents his fury; unless indeed he should be struck, and then, at no loss to know whence the blow came, he instantly deserts his prey, in order to obtain revenge for the injury. The flesh of the camel he is said to prefer to that of any other animal. He is likewise exceedingly fond of that of young elephants, which, from their inability to resist him till they have received the assistance of their tusks, he easily dispatches, when unprotected by the dam; nor are there any animals able to oppose the lion, but the elephant, the rhinoceros, the tiger, and the hippopotamus.

However terrible this animal may be, it is not uncommon, with dogs of a large size, and well supported with a proper number of men on horseback, to chase him, dislodge him, and force him to retire. But for this enterprise it is necessary that the dogs, and even the horses, should be previously disciplined; since almost all animals tremble and fly at the very smell of the lion.

Though the skin of the lion is firm and compact, it is not, however, proof against a musket ball, nor even a javelin; but he is seldom known to be dispatched with one blow. Like the wolf, he is frequently taken by stratagem; and for this purpose a deep hole is dug in the earth, over which, when slightly covered with earth and sticks, some living animal is fastened as a bait. When thus entrapped, all his fury subsides; and if advantage is taken of the first moments of his surprise, or his disgrace, he may easily be chained, muzzled, and conducted to a place of security.

The flesh of the lion is of a strong and disagreeable flavor; yet the negroes and the Indians do not dislike it, and it frequently forms a part of their food.

The good qualities, and particularly the courage and magnanimity of the lion, have been the theme of panegyric to Buffon, and other writers on natural history. Later naturalists, however, are disposed to estimate his merits at a lower rate. "The 'lordly lion,'" says Godman, "conceals himself near the places where deer and other animals come to drink, and springs upon them from his ambush, like the veriest tom-cat; having feeble sight, and being unfit for the chase, he follows the wild dogs and chacals,

which run down buffaloes, antelopes, &c., and when they have succeeded, drives them off and gorges to repletion; as he relinquishes the carcass when satiated, he is called *generous;* as he does not attack and devour men, when not hungry, he is considered *magnanimous;* he retires slowly, facing his enemies, being unable to run with speed, and is celebrated for his noble spirit; and, as he does not kill the wild dogs and other small animals, because it is not in his power to catch them, he is then called *clement;* while in virtue of his great strength, dreadful claws, horrid teeth, and awful roar, he is considered as altogether *royal.* Yet this king of quadrupeds has not half the moral excellence of a poodle dog, nor a thousandth part of the dignity of character possessed by the elephant. He is, moreover, no match for the great tiger of Asia, which, in ferocity, savage daring, audacious destructiveness, unconquerable and unappeasable hatred to mankind, is infinitely more *royal*, and a more consistent emblem of a great number of human *kings*, who have aided, in various ages and countries, to retard the progress of improvement and the march of mind."

"At the time when men first adopted the lion as the emblem of courage," says that intelligent traveller, Mr Burchell, "it would seem that they regarded great size and strength as indicating it; but they were greatly mistaken in the character they have given to this indolent, skulking animal, and have overlooked a much better example of courage, and of other virtues also, in the bold and faithful dog." Mr Barrow also brands him with the character of cowardly and treacherous.

"His forbearance and generosity," says Mr Bennett, "if the facts be carefully investigated, will be found to resolve themselves into no more than this: that in his wild state he destroys only to satiate his hunger or revenge, and never, like the 'gaunt wolves,' and the 'sullen tigers,' of whom the poet has composed his train, in the wantonness of his power and the malignity of his disposition; and that, when tamed, his hunger being satisfied, and his feelings being free from irritation, he suffers smaller animals to remain in his den uninjured, is familiar with, and sometimes fond of, the keeper, by whom he is attended and fed, and will even, when under complete control, submit to the caresses of strangers.

"But even this limited degree of amiability, which, in an animal of less formidable powers, would be considered as indicating no peculiar mildness of temper, is modified by the calls of hunger, by the feelings of revenge, which he frequently cherishes for a considerable length of time; and by various other circumstances, which render it dangerous to approach him unguardedly, even in his tamest and most domesticated state, without previously ascertaining his immediate state of mind. On such occasions, no keeper possessed of common prudence, would be rash enough to venture on confronting him. He knows too well, that it is no boy's play to

> ——————seek the lion in his den,
> And fight him there, and make him tremble there:

for in this state of irritation, from whatever cause it may have arisen he gives free scope to his natural ferocity, unrestrained by that control to which, at other times, he submits with meek and unresisting patience."

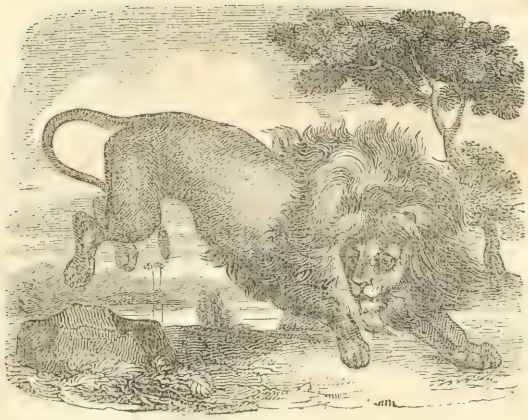
It appears, however, to be a well authenticated fact, that neither the lion nor the tiger can bear the steady gaze of the human eye, but are completely cowed by it. A writer in the South African Journal, says, "the Bechuane chief, old Peyshow, now in Cape Town, conversing with me a few days ago, said that the lion very seldom attacks man if unprovoked; but he will frequently approach within a few paces and survey him steadily; and sometimes he will attempt to get behind him, as if he could not stand his look, but was yet desirous of springing upon him unawares. If a person, in such circumstances, attempts either to fight or to fly, he incurs the most imminent peril; but if he have sufficient presence of mind coolly to confront him, without appearance of either terror or aggression, the animal will, in almost every instance, after a little space, retire. The overmastering effect of the human eye upon the lion has been frequently mentioned, though much doubted by travellers; but, from my own inquiries among lion hunters, I am perfectly satisfied of the fact; and an anecdote related to me a few days ago, by Major Mackintosh, proves that this fascinating effect is not restricted to the lion. An officer in India, well known to my informant, having chanced to ramble into a jungle, suddenly encountered a royal tiger. The rencontre appeared equally unexpected on both sides, and both parties made a dead halt, earnestly gazing on each other. The gentleman had no firearms, and was aware that a sword would be no effective defence in a struggle for life with such an antagonist! But he had heard that even the Bengal tiger might be sometimes checked by looking him firmly in the face. He did so: in a few minutes, the tiger, which appeared prepared to make his final spring, grew disturbed—slunk aside—and attempted to creep round upon him behind. The officer turned constantly upon the tiger, which still continued to shrink from his glance; but darting into the thicket, and again issuing forth at a different quarter, it persevered for above half an hour in this attempt to catch him by surprise; till at last it fairly yielded to the contest, and left the gentleman to pursue his *pleasure walk*. The direction he now took, as may be easily believed, was straight to the tents, at double quick time."

THE BENGAL LION.

The uniformity of his color is one characteristic which distinguishes the lion from his congeners of the feline race. Except in his young state, when there is an appearance of stripes, he is of a pale tawny above, which becomes somewhat lighter beneath. A second mark is, the long and flowing mane of the full grown male, which, commencing nearly at the root of his nose, extends backwards over his shoulders, and gracefully undulates on each side of his face and neck. A third is, a long and blackish tuft of hairs which terminates his tail. In size, the Asiatic lion rarely equals the southern African. He is of a more uniform and pale yellow, and has a peculiar appendage in the long hairs which begin beneath the neck, and occupy the whole of the middle line of the body below.

The lioness has no mane, is of smaller size than the lion, more slenderly and delicately made, and more graceful and agile in her movements. The head of the lion is almost uniformly elevated; that of the lioness is almost uniformly carried on a level with the line of her back, which gives her a sullen and downcast look. The period of gestation is a hundred and eight days. The young are born with the eyes open; but the ear does not become completely erect for two months. The lion arrives at maturity in five years, and is then nearly eight feet long.

THE CAPE LION.



THERE are two varieties of this species, which, from their color, particularly of the manes, are designated by the settlers, as the *pale* and the *black lion*. The latter of these is the larger and more ferocious of the two, and is occasionally found of the enormous length of eight feet from the tip of the nose to the origin of the tail. The tail is usually about half the length of the body. The pale variety is the more common.

The colonists at the Cape bear the lion a deadly hatred for the mischief which he does to them, particularly in the destruction of their horses, for the flesh of which he seems to have an especial liking. Being excellent marksmen, they will almost attack him singly; but the more common mode of attacking him is by hunting parties.

The hunting of an African lion is described with infinite spirit by Mr Pringle, who was a settler on the eastern frontier of the Cape colony. "One night," says he, "a lion, that had previously purloined a few sheep out of my kraal, came down and killed my riding horse, about a hundred yards from the door of my cabin. Knowing that the lion, when he does not carry off his prey, usually conceals himself in the vicinity, and is very apt to be dangerous by prowling about the place in search of more game, I resolved to have him destroyed or dislodged without delay. I therefore sent a messenger round the location, to invite all who were willing to assist in the enterprise, to repair to the place of rendezvous as speedily as possible. In an hour, every man of the party, (with the exception of two pluckless fellows, who were kept at home by the women,) appeared, ready mounted and armed. We were also reinforced by about a dozen of the 'Bastuard' or mulatto Hottentots, who resided at that time upon our territory as tenants or herdsmen,—an active and enterprising, though rather an unsteady, race

of men. Our friends, the Tarkaboors, many of whom are excellent lion hunters, were all too far distant to assist us, our nearest *neighbors* residing at least twenty miles from the location. We were, therefore, on account of our own inexperience, obliged to make our Hottentots the leaders of the chase.

"The first point was to track the lion to his covert. This was effected by a few of the Hottentots, on foot. Commencing from the spot where the horse was killed, they followed the *spoor*, (track,) through grass, and gravel, and brushwood, with astonishing ease and dexterity, where an inexperienced eye could discern neither foot print nor mark of any kind,—until at length we fairly tracked him into a large *bosch*, or straggling thicket of brushwood and evergreens, about a mile distant.

"The next object was to drive him out of this retreat, in order to attack him in close phalanx, and with more safety and effect. The approved mode, in such cases, is to torment him with dogs till he abandons his covert, and stands at bay in the open plain. The whole band of hunters then march forward together, and fire deliberately one by one. If he does not speedily fall, but grows angry and turns upon his enemies, they must then stand close in a circle, and turn their horses, rear outward; some holding them fast by the bridles, while the others kneel to take a steady aim at the lion as he approaches, sometimes up to the very horses' heels, couching every now and then, as if to measure the distance and strength of his enemies. This is the moment to shoot him fairly in the forehead, or some other mortal part. If they continue to wound him ineffectually till he waxes furious and desperate, or if the horses, startled by his terrific roar, grow frantic with terror, and burst loose, the business becomes rather serious, and may end in mischief; especially if all the party are not men of courage, coolness, and experience. The frontier boors are, however, generally such excellent marksmen, and, withal, so cool and deliberate, that they seldom fail to shoot him dead as soon as they get within a fair distance.

"In the present instance, we did not manage matters quite so scientifically. The Bastuards, after recounting to us all these and other sage laws of lion hunting, were themselves the first to depart from them. Finding that the few indifferent hounds which we had, made little impression on the enemy, they divided themselves into two or three parties, and rode round the jungle, firing into the spot where the dogs were barking round him, but without effect. At length, after some hours spent in thus beating about the bush, the Scottish blood of some of my countrymen began to get impatient; and three of them announced their determination to march in and beard the lion in his den, provided three of the Bastuards, (who were superior marksmen,) would support them and follow up their fire, should the enemy venture to give battle. Accordingly, in they went, (in spite of the warnings of some more prudent men among us,) to within fifteen or twenty paces of the spot where the animal lay concealed. He was couched among the roots of a

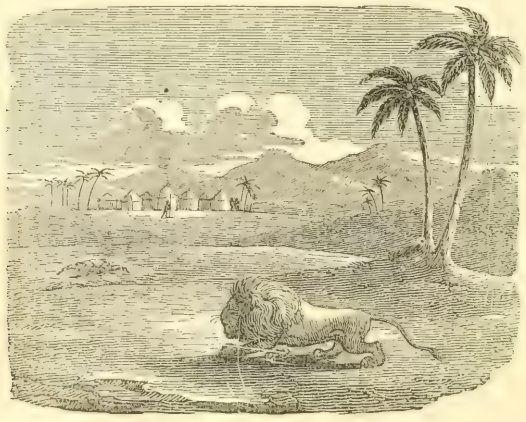
large evergreen bush, with a small space of open ground on one side of it; and they fancied, on approaching, that they saw him distinctly lying glaring at them from beneath the foliage. Charging the Bastuards to stand firm and level fair, should *they* miss, the Scottish champions let fly together, and struck, not the lion, as it afterwards proved, but a great block of red stone, beyond which he was actually lying. Whether any of the shot grazed him is uncertain, but, with no other warning than a furious growl, forth he bolted from the bush. The pusillanimous Bastuards, in place of now pouring in their volley upon him, instantly turned and fled helter-skelter, leaving him to do his pleasure upon the defenceless Scots; who, with empty guns, were tumbling over each other, in their hurry to escape the clutch of the rampant savage. In a twinkling he was upon them, and with one stroke of his paw dashed the nearest to the ground. The scene was terrific! There stood the lion with his paw upon his prostrate foe, looking round in conscious power and pride upon the bands of his assailants, and with a port the most noble and imposing that can be conceived. It was the most magnificent thing I ever witnessed. The danger of our friends, however, rendered it at the moment too terrible to enjoy either the grand or the ludicrous part of the picture. We expected every instant to see one or more of them torn in pieces; nor, though the rest of the party were standing within fifty paces with their guns cocked and levelled, durst we fire for their assistance. One was lying under the lion's paw, and the others scrambling towards us in such a way as to intercept our aim at him. All this passed far more rapidly than I have described it. But luckily, the lion, after steadily surveying us for a few seconds, seemed willing to be quits with us on fair terms; and with a fortunate forbearance, (for which he met but an ungrateful recompense,) turned calmly away, and driving the snarling dogs like rats from among his heels, bounded over the adjoining thicket, like a cat over a footstool, clearing brakes and bushes twelve or fifteen feet high, as readily as if they had been tufts of grass, and, abandoning the jungle, retreated towards the mountains.

"After ascertaining the state of our rescued comrade, (who fortunately had sustained no other injury than a slight scratch on the back, and a severe bruise in the ribs, from the force with which the animal had dashed him to the ground,) we renewed the chase with Hottentots and hounds in full cry. In a short time we again came up with the enemy, and found him standing at bay under an old mimosa tree, by the side of a mountain stream, which we had distinguished by the name of Douglas water. The dogs were barking round, but afraid to approach him, for he was now beginning to growl fiercely, and to brandish his tail in a manner that showed he was meditating mischief. The Hottentots, by taking a circuit between him and the mountain, crossed the stream, and took a position on the top of a precipice overlooking the spot where he stood. Another party of us occupied a position on the other side of the glen; and placing the poor fellow thus between

two fires, which confused his attention and prevented his retreat, we kept battering away at him till he fell, unable again to grapple with us, pierced with many wounds.

"He proved to be a full grown lion of the yellow variety, about five or six years of age. He measured nearly twelve feet from the nose to the tip of the tail. His fore leg, below the knee, was so thick that I could not span it with both hands; and his neck, breast, and limbs appeared, when the skin was taken off, a complete congeries of sinews."

Major Denham furnishes us with the following anecdote: "The skin of a noble lion was sent me by the sheikh, which had been taken near Kabshary, measuring from the tail to the nose fourteen feet two inches. He had devoured four slaves, and was at last taken by the following stratagem; the inhabitants assembled together, and, with loud cries and noises, drove him from the place where he had last feasted; they then dug a very deep blaque, or circular hole, armed with sharp pointed stakes; this they most cunningly covered over with stalks of the gussub; a bundle of straw, enveloped in a robe, was laid over the spot, to which a gentle motion, like that of a man turning in sleep, was occasionally given by means of a line carried to some distance. On their quitting the spot, and the noise ceasing, the lion returned to his haunt, and was observed watching his trap for seven or eight



hours—by degrees approaching closer and closer,—and at length he made a dreadful spring on his supposed prey, and was precipitated to the bottom of the pit. The Kabsharians now rushed to the spot, and before he could recover himself, despatched him with their spears."

It has been remarked of the lion, by the Bushmen, that he generally kills and devours his prey in the morning at sunrise, or sunset. On this account, when they intend to kill lions, they generally notice where the spring-bucks

are grazing at the rising of the sun; and by observing, at the same time, if they appear frightened and run off, they conclude that they have been attacked by the lion. Marking accurately the spot where the alarm took place, about eleven o'clock in the day, when the sun is powerful, and the enemy they seek is supposed to be fast asleep, they carefully examine the ground, and finding him in a state of unguarded security, they lodge a poisoned arrow in his breast. The moment the lion is thus struck he springs from his lair, and bounds off as helpless as the stricken deer. The work is done; the arrow of death has pierced his heart, without even breaking the slumbers of the lioness which may have been lying beside him; and the Bushman knows where, in the course of a few hours, or even in less time, he will find him dead, or in the agonies of death.

Mr Burchell furnishes us with the following lively description:—"The day was exceedingly pleasant, and not a cloud was to be seen. For a mile or two we travelled along the banks of the river, which in this part abounded in tall mat-rushes. The dogs seemed much to enjoy prowling about and examining every bushy place, and at last met with some object among the rushes which caused them to set up a most vehement and determined barking. We explored the spot with caution, as we suspected, from the peculiar tone of their bark, that it was, what it proved to be, lions. Having encouraged the dogs to drive them out, a task which they performed with great willingness, we had a full view of an enormous black maned lion, and a lioness. The latter was seen only for a minute, as she made her escape up the river, under concealment of the rushes; but *the lion* came steadily forward and stood still to look at us. At this moment we felt our situation not free from danger, as the animal seemed preparing to spring upon us, and we were standing on the bank at the distance of only a few yards from him, most of us being on foot and unarmed, without any visible possibility of escaping. I had given up my horse to the hunters, and was on foot myself, but there was no time for fear, and it was useless to attempt avoiding him. I stood well upon my guard, holding my pistols in my hand, with my finger upon the trigger, and those who had muskets kept themselves prepared in the same manner. But at this instant, the dogs boldly flew in between us and the lion, and surrounding him, kept him at bay by their violent and resolute barking. The courage of these faithful animals was most admirable; they advanced up to the side of the huge beast, and stood making the greatest clamor in his face, without the least appearance of fear. The lion, conscious of his strength, remained unmoved at their noisy attempts, and kept his head turned towards us. At one moment, the dogs perceiving his eyes thus engaged, had advanced close to his feet, and seemed as if they would actually seize hold of him, but they paid dearly for their imprudence, for, without discomposing the majestic and steady attitude in which he stood fixed, he merely moved his paw, and at the next instant I beheld two lying dead. In doing this, he made so little exertion, that it

was scarcely perceptible by what means they had been killed. Of the time which we had gained by the interference of the dogs, not a moment was lost; we fired upon him; one of the balls went through his side just between the short ribs, and the blood immediately began to flow, but the animal still remained standing in the same position. We had now no doubt that he would spring upon us; every gun was instantly reloaded; but happily we were mistaken, and were not sorry to see him move quietly away; though I had hoped in a few minutes to have been enabled to take hold of his paw without danger.

"This was considered, by our party, to be a lion of the largest size, and seemed, as I measured him by comparison with the dogs, to be as large as an ox. He was certainly as long in body, though lower in stature; and his copious mane gave him truly a formidable appearance. He was of that variety which the Hottentots and boors distinguish by the name of the *black lion*, on account of the blacker color of the mane, and which is said to be always larger and more dangerous than the other, which they call the *pale lion*. Of the courage of a lion I have no very high opinion, but of his majestic air and movements, as exhibited by this animal, while at liberty in his native plains, I can bear testimony. Notwithstanding the pain of a wound, of which he must soon afterwards have died, he moved slowly away with a stately and measured step.

"The lion, as we have seen, principally lives in the plains, and is always found where there are large herds of wild antelopes and other animals feeding together, in that fellowship which is characteristic of each species. To all these animals he is an object of unceasing dread. It is supposed by the agitation which oxen display when a lion is near them, that they can scent him at a considerable distance. Whatever may be his physical strength, therefore, and we know that it is prodigious, it is evident he could not accomplish his purposes by strength alone. The instinctive fear of the creatures upon which he preys would be constantly called into action, by their keen sight and acute scent; and they would remove to some distant part before the destroyer could reach them. The lion, too, as well as the tiger, and others of the same species, seldom runs. He either walks, or creeps, or, for a short distance, advances rapidly by great bounds. It is evident, therefore, that he must seize his prey by stealth; that he is not fitted for an open attack; and that his character is necessarily that of great power united to considerable wariness in its exercise.

"Every one, almost, is familiar with the roar of the lion. It is a sound of terror, and produces an appalling effect. It is said by travellers that it sometimes resembles the sound which is heard at the moment of an earthquake; and that he produces this extraordinary effect by laying his head upon the ground, and uttering a half stifled growl, by which means the noise is conveyed along the earth. The instant this roar is heard by the animals who are reposing in the plains, they start up with alarm; they fly

in all directions; they rush into the very danger which they seek to avoid This fearful sound, which the lion utters, is produced by the great comparative size of the larynx, the principal organ of voice in all animals.* He utters it to excite that fear which is necessary to his easy selection of an individual victim.

"The lion, as well as all of the cat tribe, takes his prey at night; and it is necessary, therefore, that he should have peculiar organs of vision. In all those animals which seek their food in the dark, the eye is usually of a large size, to admit a great number of rays; and that part which is called the *choroides* reflects, instead of absorbing, the light. The power of seeing in the dark, which the cat tribe possesses, has always appeared a subject of mystery; and it is natural that it should be so, for man himself sees with more difficulty in the dark than any other animal; he has a compensation in his ability to produce artificial light. This peculiar kind of eye, therefore, is necessary to the lion to perceive his prey; and he creeps towards it with a certainty which nothing but this distinct nocturnal vision could give

"Every one must have observed what are usually called the *whiskers* on a cat's upper lip. The use of these in a state of nature is very important. They are organs of touch. The slightest contact of these whiskers with any surrounding object is felt most distinctly by the animal, although the hairs are themselves insensible. They stand out on each side, in the lion, as well as in the common cat, so that, from point to point, they are equal to the width of the animal's body.

"If we imagine, therefore, a lion stealing through a covert of wood in an imperfect light, we shall at once see the use of these long hairs. They indicate to him, through the nicest feeling, any obstacle which may present itself to the passage of his body; they prevent the rustle of boughs and leaves, which would give warning to his prey if he were to attempt to pass through too close a bush;—and thus, in conjunction with the soft cushions of his feet, they enable him to move towards his victim with a stillness greater even than that of the snake, who creeps along the grass, and is not perceived till he has coiled round his prey."

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* "The size of the larynx is proportionate to the strength of the sounds which animals utter. The absolute size of the larynx of the whale and the elephant is the largest; but relatively the larynx of the lion has a still greater circumference."—Notes to Blumenbach's Comp. Anatomy, by Lawrence and Coulson, 1827.

THE PUMA, OR COUGAR.[1]

The puma, cougar, or American lion, is from four to five feet long, but more commonly of the former size, and has a tail of half that length, which has not, like that of the lion, a terminating brush of hair; neither has the puma a mane. Indeed, his name of lion could only have been given to him by careless or unscientific observers, as his uniform sameness of color is the sole point of resemblance which he has to the king of beasts. He has a small rounded head, a broad and rather obtuse muzzle, and a body which, in proportion, is slender and less elevated than that of his more dignified namesake. "The upper parts of his body," says Mr Bennett, "are of a bright silvery fawn, the tawny hairs being terminated by whitish tips: beneath and on the inside of the limbs he is nearly white, and more completely so on the throat, chin, and upper lip. The head has an irregular mixture of black and gray; the outside of the ears, especially at the base, the sides of the muzzle from which the whiskers take their origin, and the extremity of the tail, are black." The fur of the cubs has spots of a darker hue, which are visible only in certain lights, and disappear when the animal is full grown. Both the sexes are of the same color.

The puma* was once spread over the whole wide extent of the new world, from Canada to Patagonia. The progress of civilization has, however, circumscribed his range, and has rooted him out in many places. Notwithstanding his size and strength, he is cowardly; and, like almost all cowards, he is sanguinary. If he find a flock of sheep unprotected, he will

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[1] *Felis concolor*, Lin.

* It is not now common, in any part of the United States, except the unsettled districts It is usually called the panther, or painter, by the common people. It is also called the catamount.

destroy the whole, merely that he may enjoy the luxury of sucking their blood. As he possesses much timidity and little swiftness, and in South America frequents the open plains, he generally falls a victim when the hunter pursues him with the unerring lasso.

In seizing its prey, the puma crawls softly on his belly through the shrubs and bushes, conceals itself in ditches, or assumes a fawning appearance. As soon, however, as it can reach its victim, it leaps on its back by one bound, and soon rends it to pieces. Molina tells us, that, in Chili, where the husbandmen tether their horses in the fields by pairs, the puma kills and drags one away, and compels the other to follow by occasionally striking it with his paw. All animals are not thus easily vanquished. Asses defend themselves with their heels, and are often victorious; and cows form themselves into a circle round their calves, turn their horns towards the assailant, and not unfrequently destroy him. Even a woman or a child can put him to flight. When hunted with dogs, however, and cut off from his retreat to a rock or a tree, he places himself under the trunk of a large tree, and fights furiously.

The puma is easily tamed, and in captivity becomes tractable, and even attached. It loves to be noticed and caressed, expresses its pleasure by purring, will follow its owner about like a dog, and has been known to suffer children to ride upon its back.

The following anecdotes are from Godman:—

"Two hunters, accompanied by two dogs, went out in quest of game near the Catskill mountains. At the foot of a large hill, they agreed to go round it in opposite directions, and when either discharged his rifle, the other was to hasten towards him to aid in securing the game. Soon after parting, the report of a rifle was heard by one of them, who, hastening towards the spot, after some search, found nothing but the dog, dreadfully lacerated and dead. He now became much alarmed for the fate of his companion, and while anxiously looking around, was horror-struck by the harsh growl of a cougar, which he perceived on a large limb of a tree, crouching upon the body of his friend, and apparently meditating an attack on himself. Instantly he levelled his rifle at the beast, and was so fortunate as to wound it mortally, when it fell to the ground along with the body of his slaughtered companion. His dog then rushed upon the wounded cougar, which with one blow of its paw laid the poor animal dead by its side. The surviving hunter now left the spot, and quickly returned with several other persons, when they found the lifeless cougar extended near the dead bodies of the hunter and the faithful dogs."

"About the close of the late war, a merchant of Piqua, named Herse, received a considerable sum of money in small bills, which made it appear of still greater magnitude to several suspicious looking persons who were present when it was received. Mr Herse being unarmed, was apprehensive that an attempt would be made to rob him at the camping ground, and

expressed his apprehensions to a single fellow-traveller, who was also unprovided with arms. In consequence, they resolved not to go to the camping ground, but to pass the night in the woods without fire; there, turning their horses loose, they lay down in their blankets on the leaves. In the night they were aroused by hearing the horses snort, as they are apt to do on the approach of Indians, and shortly after they were heard to make several bounds through the woods, as if some one had unsuccessfully attempted to catch them. After some time had elapsed, they both distinctly heard, what they supposed to be, a man crawling towards them on his hands and feet, as they could hear first one hand cautiously extended and pressed very gently on the leaves, to avoid making a noise, then the other, and finally the other limbs in like manner and with equal care. When they believed that this felonious visitor was within about ten feet of them, they touched each other, sprang up simultaneously, and rushed to some distance through the woods, where they crouched and remained without further disturbance. A short time after, they heard the horses snorting and bounding furiously through the woods, but they did not venture to arise until broad daylight, being still ignorant of the character of their enemy.

"When sufficiently light to see, by climbing a sapling, they discovered the horses at a considerable distance on the prairie. On approaching them, it was at once evident that their disturber had been nothing less than a cougar. It had sprung upon the horses, and so lacerated with its claws and teeth their flanks and buttocks, that with the greatest difficulty were they able to drive the poor creatures before them to Shane's. Several other instances of annoyance to travellers had happened at the same place, and Shane believed by the same cougar."

THE TIGER.[1]

In the class of carnivorous animals, the lion is the foremost. Immediately after him, follows the tiger; which, while he possesses all the bad qualities of the former, seems to be a stranger to his good ones. To pride, to courage, to strength, the lion adds greatness, and sometimes, perhaps, clemency; while the tiger, without provocation, is fierce; without necessity, is cruel. Thus it is throughout all the classes of nature, in which the superiority of rank proceeds from the superiority of strength. The first class, sole masters of all, are less tyrannical than the inferior classes, which, denied so full an exertion of authority, abuse the powers entrusted to them.

More, therefore, than even the lion, the tiger is an object of terror. He is the scourge of every country which he inhabits. Of the appearance of man, and of all his hostile weapons, he is fearless; wild animals, as well as tame ones, fall sacrifices before him; the young elephant and rhinoceros he sometimes attacks; and sometimes, with an increased audacity, he braves the lion himself.

The form of the body usually corresponds with the nature and disposition of the animal. The tiger, with a body too long, with limbs too short, with a head uncovered, and with eyes ghastly and haggard, has no characteristics but those of the basest and most insatiable cruelty. For instinct, he has nothing but a uniform rage, a blind fury; so blind, indeed, so undistinguished, that he frequently devours his own progeny, and, if she offers to defend them, tears in pieces the dam herself.

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[1] *Felis tigris*, Lin.

Happy is it for the rest of nature, that this animal is not common, and that the species is chiefly confined to the warmest provinces of the East The tiger is found in Malabar, in Siam, and in Bengal.

When he has killed a large animal, such as a horse or a buffalo, he does not choose to devour it on the spot, fearing to be disturbed; and, in order to feast at his ease, he carries off his prey to the forest, dragging it along with such ease, that the swiftness of his motion seems scarcely retarded by the enormous load he sustains.

To give a still more complete idea of the strength of this terrible creature, we shall quote a passage from Father Tachard, who was an eye-witness of a combat of one tiger against two, and even three, elephants, at Siam. For this purpose, the king ordered a lofty palisade to be built, of bamboo cane, about a hundred feet square; and in the midst of this were three elephants, appointed for combating the tiger. Their heads, and part of their trunks, were covered with a kind of armor like a mask, which defended that part from the assaults of the fierce animal with which they were to engage. As soon, (says this author,) as we were arrived at the place, a tiger was brought forth from his den, of a size much larger than we had ever seen before. He was not at first let loose, but held with cords, so that one of the elephants approaching, gave him three or four blows with his trunk on the back, with such force that the tiger was for some time stunned, and lay without motion, as if he had been dead. As soon, however, as he was let loose, and at full liberty, although the first blows had greatly abated his fury, he made at the elephant with a loud shriek, and aimed at seizing his trunk. But the elephant, wrinkling it up with great dexterity, received the tiger on his great teeth, and tossed him up into the air. This so discouraged the furious animal, that he no more ventured to approach the elephant, but made several circuits round the palisade, often attempting to fly at the spectators. Shortly after, a second, and then a third elephant, were sent against him, and they continued to strike him so terribly with their trunks, that he once more lay for dead; and they would certainly have killed him, had not a stop been put to the combat.

The tiger, of which Father Gouie has communicated to the Academy of Sciences an anatomical description, composed by the Jesuit Fathers at China, seems to belong to the true species, as does also that which the Portuguese have distinguished by the name of *royal tiger*. Dellon expressly says, in his 'Travels,' that there is no country of India in which tigers so much abound, as Malabar; that there the species are numerous, but that the largest of all is that which the Portuguese call the *royal tiger*, which is very rare, and is as large as a horse.

The species of the tiger has always been much rarer, and much less generally diffused, than that of the lion. Like the lioness, nevertheless, the tigress produces four or five young ones at a birth. From her nature she is fierce at all times; but when surrounded with her infant progeny, and in the

smallest danger of losing them, her rage, her fury, becomes extravagant To oppose the daring invaders of her den, she braves every danger. On such occasions, she pursues the spoiler with an enmity the most inveterate; and he, contented to lose a part in order to save a part, is frequently obliged to drop one of her cubs. With this she immediately returns to her den, and again pursues him: he then drops another; and, by the time she has returned with that, he generally escapes with the remainder. Should her young be torn from her entirely, with hideous cries she expresses her agony and her despair, and follows the captor to the very town, or ship, in which he may have taken refuge, and dares him, as it were, to come forth.

The skins of these animals are much esteemed all over the East, particularly in China; the mandarins cover their seats of justice in the public places with them, and convert them into coverings for cushions in winter. The Indians eat the flesh of the tiger, and find it neither disagreeable nor unwholesome.

Such is the character which Buffon and many other naturalists have given to the tiger, and it certainly is not calculated to prejudice us in his favor. More recent writers have, however, and apparently with justice, endeavored to remove a part of the odium which has been thrown upon him. Mr Bennett, the scientific and acute author of the description of the animals in the Tower Menagerie and the Zoological Gardens, has labored with much eloquence to raise the tiger in the scale of estimation. "Closely allied to the lion," says he, "whom he resembles in power, in external form, in internal structure, in zoological character, in his prowling habits, and in his sanguinary propensities, the tiger is at once distinguished from that king of beasts, and from every other of their common genus, by the peculiar marking of his coat. On a ground which exhibits in different individuals various shades of yellow, he is elegantly striped by a series of transverse black bands or bars, which occupy the sides of his head, neck, and body, and are continued upon his tail, in the form of rings, the last of the series uniformly occupying the extremity of that organ, and giving to it a black tip of greater or less extent. The under parts of his body and the inner sides of his legs are almost entirely white: he has no mane, and his whole frame, though less elevated than that of the lion, is of a slenderer and more graceful make. His head is also shorter, and more rounded.

"Almost in the same degree that the lion has been exalted and magnified, at the expense of his fellow brutes, has the tiger been degraded and depressed below his natural level. While the one has been held up to admiration, as the type and standard of heroic perfection, the other has, with equal capriciousness and disregard of the close and intimate relationship subsisting between them, been looked upon by mankind in general, with those feelings of unmingled horror and detestation, which his character for untamable ferocity and insatiable thirst of blood, was so well calculated to inspire. It requires, however, but little consideration to teach us that the broad distinc-

tion which has been drawn, cannot by possibility exist, and the recorded observations of naturalists and travellers, both at home and abroad, will be found amply sufficient to prove that the difference in their characters and habits, on which so much stress has been laid, is in reality as slight and unessential as that which exists in their corporeal structure.

"Unquestionably, the tiger has not the majesty of the lion; for he is destitute of the mane, in which that majesty chiefly resides. Neither has he the same calm and dignified air of imperturbable gravity which is at once so striking and so prepossessing in the aspect of the lion. But, on the other hand, it will readily be granted, that in the superior lightness of his frame, which allows his natural agility its free and unrestricted scope, and in the graceful ease and spirited activity of his motions, to say nothing of the beauty, the regularity, and the vividness of his coloring, he far excels his competitor, whose giant bulk and comparative heaviness of person, added to the dull uniformity of his color, detract in no small degree from the impression produced by his noble and majestic bearing.

"In comparing the moral qualities of these two formidable animals, we shall also find that the shades of difference, for at most they are but shades, which distinguish them, are, like their external characteristics, pretty equally balanced in favor of each. In all the leading features of their character, the habits of both are essentially the same. The tiger, equally with the lion, and in common indeed with the whole of the group to which he belongs, reposes indolently in the security of his den, until the calls of appetite stimulate him to look abroad for food. He then chooses a convenient ambush, in which to lie concealed from observation, generally amid the underwood of the forest, but sometimes even on the branches of a tree, which he climbs with all the agility of a cat. In this secret covert he awaits with patient watchfulness the approach of his prey, upon which he darts forth with an irresistible bound, and bears it off in triumph to his den. Unlike the lion, however, if his first attack proves unsuccessful, and he misses his aim, he does not usually slink sullenly back into his retreat, but pursues his victim with a speed and activity which is seldom baffled even by the fleetest animals.

"It is evident, then, that in the general outline of his habits, and even in most of the separate traits by which his character is marked, he differs but little from the lion. His courage, if brute force stimulated by sensual appetite can deserve that honorable name, is at least equal; and as for magnanimity and generosity, the idea of attributing such noble qualities to either, is in itself so absurd, and is so fully refuted by every particular of their authentic history, that it would be perfectly ridiculous to attempt a comparison where no materials for comparison exist."

That the tiger is not irreclaimably ferocious, and that he is capable not merely of a capricious and transient liking, but of an enduring attachment, the following story affords an extraordinary and convincing proof. "A

beautiful young tiger, brought in the Pitt, East Indiaman, from China, in the year 1790, was so far domesticated as to admit of every kind of familiarity from the people on board the ship. It seemed to be quite harmless, and was as playful as a kitten. It frequently slept with the sailors in their hammocks; and would suffer two or three of them to repose their heads on its back as upon a pillow, while it lay stretched out upon the deck. In return for this indulgence, it would, however, now and then steal their meat. Having one day stolen a piece of beef from the carpenter, he followed the animal, took the meat out of its mouth, and beat it severely for the theft: which punishment it suffered with all the patience of a dog. It would frequently run out on the bowsprit; climb about the ship like a cat; and perform many other tricks, with an agility that was truly astonishing. There was a dog on board, with which it would frequently play in the most diverting manner imaginable. This animal was taken on board the ship when it was only a month or six weeks old, and arrived in England before it had quite completed its first year. On its arrival it was presented to the king, and was afterwards deposited in the Tower of London. It even there continued to be perfectly good-natured, and was, in no instance, known to be guilty of any savage or mischievous tricks.

"In the year 1801, one day after this tiger had been fed, his keeper put into the den to him, a small, rough, black terrier puppy, a female. The beast suffered it to remain uninjured, and soon afterwards became so much attached to it, as to be restless and unhappy whenever the animal was taken away to be fed. On its return, the tiger invariably expressed the greatest symptoms of delight, always welcoming its arrival by gently licking over every part of its body. In one or two instances the terrier was left in the den, by mistake, during the time the tiger had his food. The dog sometimes ventured to eat with him, but the tiger generally appeared dissatisfied with this liberty. After a residence with the tiger of several months, the terrier was removed to make way for a little female Dutch mastiff. It was, however, thought advisable, before the terrier was taken away, to shut up the mastiff for three or four days among the straw of the tiger's bed, to take off, if possible, any smell that might be offensive to the animal. The exchange was made soon after the animals had been fed, the tiger seemed perfectly satisfied with his new companion, and immediately began to lick it, as he had before done the terrier. The dog seemed at first in considerable alarm with so formidable an inmate, but in the course of the day he became perfectly reconciled to his situation. This diminutive creature the tiger would suffer to play with him, with the greatest good-nature. I have myself, says Mr Bingley, seen it bark at him, and bite him by the foot and mouth, without his expressing the least displeasure. When the dog, in its frolic, seized his foot, he merely lifted it up ou of its mouth, and seemed otherwise heedless of its attacks.

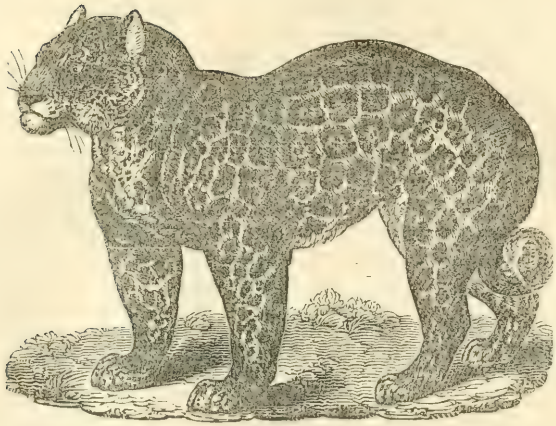
"Strange dogs were several times put into the tiger's den after his feed-

ing, and he in no instance attempted to injure them. Mr Cross, the present keeper of Exeter 'Change, and who formerly had the care of the animals in the Tower, informed me that he could himself have ventured in safety into the den. The ship-carpenter, who came over with the tiger, came to the Tower to see him. The animal, though they had been separated more than two years, instantly recognized a former acquaintance, rubbed himself backward and forward against the grating of his den, and appeared highly de lighted. Notwithstanding the urgent request that he would not expose himself to so much danger, the man begged to be let into the den, and with so much entreaty, that he was at last suffered to enter. The emotions of the animal seemed roused in the most grateful manner. He rubbed himself against him, licked his hands, fawned upon him like a cat, and in no respect attempted to injure him. The man remained there two or three hours; and he at last began to fancy there would be some difficulty in getting out alone. Such was the affection of the animal towards his former friend, and so close did he keep to his person, as to render his escape by no means so easy as he had expected. With some care, however, he got the tiger beyond the partition of the two dens, and the keeper, watching his opportunity, closed the slide, and separated them."

Among many instances which we could adduce, where individuals have fallen victims to these animals, we may mention that related by Dr Shaw, where the son of Sir Hector Monro was, in 1792, attacked by a tiger, accompanied by a tigress, in such a manner as caused his death within twenty-four hours. This animal lies in ambush for his prey, and not unfrequently destroys his own young. Sometimes he forms his ambush on the borders of rivers and streams, where other animals are compelled to repair, by the heat of the climate, for their drink; but his velocity in running is so great, that few creatures escape inevitable destruction.

These animals are peculiar to Asia. They are generally natives of Bengal, the kingdoms of Siam, Tonquin, Sumatra, and China, also the countries north of China, the Indus, and those of Southern Asia. Buffon says they are also found in Southern Africa; but Mr Pennant observes, that he could find no authority for his assertion, inasmuch as the animals called tigers by Ludolphus and Kolben were only the leopard or panther. The same gentleman also observes, that this animal is, by an improper misnomer, given to Africa and America. The natives of Sumatra are so infatuated with the belief that they are animated by the souls of their ancestors, that they seldom destroy them.

THE JAGUAR,[1]



Which is sometimes called the American tiger, is one of the most formidable animals of the New World. He is to be found in the southern division of America, from Paraguay to Guiana; but he does not appear to inhabit to the northward of the Isthmus of Darien. Even in the south the race is gradually growing more rare, in consequence of the double temptation to destroy him, which is offered by the desire of getting rid of a beast so destructive to the flocks, and by the high price which is obtained for his skin.

More robust and more clumsy than the leopard, he is also much superior in size, as he often measures four or five feet from the nose to the root of the tail. His head is larger and rounder than the leopard's, his limbs are shorter, and his tail is of such a length as only to allow the tip to trail on the ground when the animal stands erect. Above the line of the eyes, the profile is also more prominent.

"These differences of form,' says Mr Bennett, 'are accompanied by differences in color and markings equally decisive. The general appearance is, at the first glance, the same in both; but the open roses of the leopard are scarcely more than half the size of those of the jaguar, and they all enclose a space of one uniform color, in which, unless in some rare and accidental instances, no central spots exist, while, in the latter animal, most of those which are arranged along the upper surface near the middle line of the back, are distinguished by one or two small black spots enclosed within their circuit. The middle line itself is occupied in the leopard by open roses, intermixed with a few black spots of small size and roundish form; that of

[1] *Felis onca*, Lin.

the jaguar, on the contrary, is marked by one or two regular longitudinal lines of broad, elongated deep black patches, sometimes extending several inches in length, and occasionally forming an almost continuous band from between the shoulders to the tail. The black rings towards the tip of the latter are also more completely circular than in the leopard."

The jaguar is a solitary animal, residing in forests, especially near large rivers. He is an excellent swimmer. D'Azara tells us, partly from personal observation, that, after a jaguar had destroyed a horse, he dragged the body sixty paces, and then swam with it over a broad and deep river. He is equally expert at climbing. "I have seen," says M. Sonini, "in the forests of Guiana, the prints left by the claws of the jaguar on the smooth bark of a tree from forty to fifty feet in height, measuring about a foot and a half in circumference, and clothed with branches near its summit alone. It was easy to follow, with the eye, the efforts which the animal had made to reach the branches: although his talons had been thrust deeply into the body of the tree, he had met with several slips, but he had always recovered his ground, and, attracted no doubt by some favorite object of prey, had at length succeeded in gaining the very top."

The jaguar lies in ambush for his prey, on which he pounces suddenly, and his great muscular strength enables him instantly to bear it to the ground. Man he does not often attack, and never but by stealth. While M. Sonini was travelling in Guiana, his party was closely dogged for three nights by one of these animals, which eluded all their attempts to shoot it, and would, doubtless, have carried off any individual who might have unguardedly exposed himself.

Ferocious as he is in his wild state, the jaguar, when captive, becomes tame and even mild, and is particularly fond of licking the hands of those with whom he is familiar.

The taking of the jaguar forms a portion of the warlike features distinguishing the Indians of South America, particularly the Llaneros, or men of the plains. One inducement a Llanero has in pursuing the jaguar, is the honor of the feat—for the value of its skin and the little depredations it commits on the flocks, would never, I apprehend, (says a late traveller in South America,) induce him to risk a single combat with such fierce animals; but there is a stronger stimulus, viz. that killing seven jaguars, or six tigers, will give him the title of *guapo*, or warrior, and the privilege of choosing the fattest virgin in the tribe, for his companion; for with them, the lady who is most *en bon point*, is most beautiful. This alone is a sufficient inducement; and they endeavor to complete their task as early as the age of seventeen. At the approach of the breeding season, they watch with great assiduity the battles that take place between the male and the female, as this is a sure indication of her littering, not wishing to have the male know where she deposits the cubs, as some naturalists assert that he eats them; others, that he hugs them to death. However this be, she

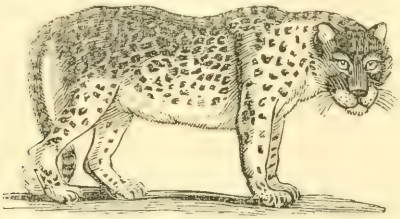
never suffers him to approach the jungle, if I may be allowed to call it so until they are able to run after her. During this period, he awaits her with the most tender solicitude, and even brings her a portion of his prey. He is seen hovering instinctively about the place where she is crouched at noontide. When the Llanero perceives this, he envelopes himself in a jaguar's skin, and approaches him, taking good care to have the wind in his favor, as the jaguar's keen scent would soon discover the imposition Even this sagacity and instinct they think they have got over, by burning plaintain leaves so as to take away for hours any scent which the human body has; though this is probably a mere fancy. As soon as the Llanero perceives the jaguar, he runs from him on all fours, and endeavors to mimic the whining cry of the beast, which by some is said to be like a cat, or like hogs crouching in a sty; the latter is what I would compare them to, as I have seen them mustering by night previous to hunting. As soon as the male perceives him, he bounds towards him; when the Llanero dexterously throws the noose (the lasso) over him, and soon strangles him. Sometimes he wounds him with his lance, and then a sanguinary conflict takes place. As the Llanero has his left arm well bound round with tanned horse skin, impervious to the jaguar's tusks, he presents his left hand; as soon as the jaguar seizes it, he is stabbed with a long knife, which seldom misses the heart, as the principal excellence of a *guapo*, is killing the beast with as few stabs as possible. As soon as he dispatches the male, the female becomes an easy prey. Sometimes the Llaneros, when their numbers are complete, will, to show their dexterity and address, decoy the jaguar into a defile, when the man uncovers and shows himself; the jaguar endeavors to retreat, but is prevented by other Indians, who scare him with firebrands, for they can produce fire by rubbing two pieces of wood together, as quick as with tinder. In this manner they worry him with dogs, while they keep him at bay until the women arrive to witness their cruelty. As the jaguar gets frantic, he endeavors to bite at every thing near him; as often as the creature opens his mouth, he is sure to have a burning torch rammed into his throat, until madness exhausts him, and he is no longer able to close his jaws; then the women and boys descend from their high positions, chop off his paws, hammer out his teeth, and often skin him alive, while the boys are smeared with the blood, in order to make them good warriors, and the mothers take delight in seeing the animosity they have to the creature, even when no longer able to do any injury. As to the female jaguar, they have only to come near her crouching place to provoke a quarrel, as she will often attack them before they are within two hundred yards of it: in her they sometimes find a more formidable enemy than in the male, although much inferior in point of size and strength, but more subtle and crafty; their bite is difficult to heal, and the Llanero think a wound from a jaguar a great disgrace; so much so, that a young aspirant for the title of *guapo*, who had the misfortune of being wounded in a ren-

contre, was so much ashamed of acknowledging it, that he suffered a morti fication sooner than expose the wound, although he was well aware the women possessed a salve that would cure him.

THE BLACK TIGER.[1]

This animal is a native of South America, and is generally considered as a very ferocious and destructive beast. It is about the size of a heifer of a year old, and is entirely of a deep brownish black color on the upper parts, and of a pale gray, or whitish hue underneath; the upper lip and paws are also whitish, but the tail is of the same dusky appearance as the body.

THE PANTHER[1]



Resembles the tiger in its habits, and the leopard in its skin. Like the tiger, it has an insatiable thirst of blood, and an untamable ferocity; like the leopard, its skin is spotted, but is less beautiful than the skin of that animal. It seems, in truth, only a large variety of the leopard. The panther is usually more than six feet long, independent of the tail, which is about three feet in length. In Africa, one was killed by Major Denham, which was more than eight feet in length. His hair is short, sleek, and mossy, and his color is, in general, of a bright tawny yellow, elegantly marked with black spots, disposed in circles of four or five each, with a single spot in the centre: his chest and belly are white. He has short and pointed ears, fierce and restless eyes, a strong, harsh cry, and a savage aspect. So rapid are his movements that few animals can escape him, and such is his agility, that he climbs trees in pursuit of his prey, and is sure of seizing his victim. The flesh of animals is said to be his favorite food but when pressed by hunger he makes his attacks without discrimination.

In the time of the Romans, panthers appear to have been very numerous, and at present the species is said to extend from Barbary to the remotest parts of Guinea.

[1] *Felis nigra*, a variety of the preceding. [2] *Felis pardus*, Lin.

It must be observed, that it is very doubtful whether the panther has ever yet been truly represented in any drawing. Temminck is of opinion that all the nominal representations of panthers are really those of leopards.

Major Denham, in his travels in Africa, furnishes us with the following description: "During the latter part of the night, while riding on in front with Maramy, the sheikh's negro, who had accompanied me from Kouka, and who appeared to attach himself more closely to me as we approached danger, we had started several animals of the leopard species, who ran from us so swiftly, twisting their long tails in the air, as to prevent our getting near them. We, however, now started one of a larger kind, which Maramy assured me was so satiated with the blood of a negro, whose carcass we found lying in the wood, that he would be easily killed. I rode up to the spot just as a Shouaa had planted the first spear in him, which passed through the neck, a little above the shoulder, and came down between the animal's legs; he rolled over, broke the spear, and bounded off with the lower half in his body. Another Shouaa galloped up within two arms' length, and thrust a second spear through his loins; and the savage animal, with a woful howl, was in the act of springing on his pursuer, when an Arab shot him through the head with a ball, which killed him on the spot.

"It was a male panther, (zazerma,) of a very large size, and measured, from the point of the tail to the nose, eight feet two inches; the skin was yellow, and beautifully marked with orbicular spots on the upper part of the body, while underneath, and at the throat, the spots were oblong and irregular, intermixed with white. These animals are found in great numbers in the woods bordering on Mandara; there are also leopards, the skins of which I saw, but not in great numbers. The panthers are as insidious as they are cruel; they will not attack any thing that is likely to make resistance, but have been known to watch a child for hours, while near the protection of huts or people. It will often spring on a grown person, male or female, while carrying a burthen, but always from behind: the flesh of a child or of a young kid it will sometimes devour; but when any full grown animal falls a prey to its ferocity, it sucks the blood alone."

The following narrative of an encounter with a panther, which is copied from the Library of Entertaining Knowledge, will abundantly prove the formidable nature of the panther, even when the animal is not of its largest size.

"I was at Jaffna, at the northern extremity of the island of Ceylon, in the beginning of the year 1819," says the writer, "when, one morning, my servant called me an hour or two before my usual time, with, 'Master, master! people sent for master's dogs—tiger in the town!' Now, my dogs chanced to be some very degenerate specimens of a fine species, called the Poligar dog, which I should designate as a sort of wiry-haired greyhound, without scent. I kept them to hunt jackals; but tigers are very different things. By the way, there are no real tigers in Ceylon; but leopards and panthers

are always called so, and by ourselves as well as by the natives. This turned out to be a panther. My gun chanced not to be put together; and while my servants were doing it, the collector and two medical men, who had recently arrived, in consequence of the cholera morbus having just then reached Ceylon from the continent, came to my door, the former armed with a fowling-piece, and the two latter with remarkably blunt hog spears. They insisted upon setting off without waiting for my gun, a proceeding not much to my taste. The tiger (I must continue to call him so,) had taken refuge in a hut, the roof of which, like those of Ceylon huts in general, spread to the ground like an umbrella; the only aperture into it was a small door, about four feet high. The collector wanted to get the tiger out at once. I begged to wait for my gun; but no—the fowling-piece, (loaded with ball of course,) and the two hog spears were quite enough. I got a hedge stake, and awaited my fate from very shame. At this moment, to my great delight, there arrived from the fort an English officer, two artillery men, and a Malay captain; and a pretty figure we should have cut without them, as the event will show. I was now quite ready to attack, and my gun came a minute afterwards. The whole scene which follows, took place within an enclosure, about twenty feet square, formed, on three sides, by a strong fence of palmyra leaves, and on the fourth by the hut. At the door of this, the two artillery men planted themselves; and the Malay captain got at the top, to frighten the tiger out by worrying it,—an easy operation, as the huts there are covered with cocoa-nut leaves. One of the artillery men wanted to go in to the tiger, but we would not suffer it. At last the beast sprang: this man received him on his bayonet, which he thrust apparently down his throat, firing his piece at the same moment. The bayonet broke off short, leaving less than three inches on the musket; the rest remained in the animal, but was invisible to us: the shot probably went through his cheek, for it certainly did not seriously injure him, as he instantly rose upon his legs, with a loud roar, and placed his paws upon the soldier's breast. At this moment, the animal appeared to me about to reach the centre of the man's face; but I had scarcely time to observe this, when the tiger, stooping his head, seized the soldier's arm in his mouth, turned him half round staggering, threw him over on his back, and fell upon him. Our dread now was, that if we fired upon the tiger, we might kill the man: for the moment there was a pause, when his comrade attacked the beast exactly in the same manner as the gallant fellow himself had done. He struck his bayonet into his head; the tiger rose at him—he fired; and this time the ball took effect, and in the head. The animal staggered backwards, and we all poured in our fire. He still kicked and writhed; when the gentlemen with the hog spears advanced, and fixed him, while some natives finished him, by beating him on the head with hedge stakes. The brave artillery man was, after all, but slightly hurt: he claimed the skin, which was very cheerfully given to him. There was, however,

a cry among the natives that the head should be cut off: it was; and, in so doing, *the knife came directly across the bayonet.* The animal measured scarcely less than four feet from the root of the tail to the muzzle. There was no tradition of a tiger having been in Jaffna before; indeed, this one must have either come a distance of almost twenty miles, or have swam across an arm of the sea nearly two in breadth; for Jaffna stands on a peninsula on which there is no jungle of any magnitude."

THE LEOPARD.[1]

This formidable and sanguinary animal is found nearly throughout the whole of Africa, and in eastern and southern Asia. He usually measures about three feet in length, exclusive of the tail, but sometimes reaches four feet. His appearance indicates his natural disposition. He has a restless eye and a sinister countenance, and all his motions are hasty and abrupt. In rapidity, agility, and precision of motion, he is unrivalled by any other animal; an advantage which he owes to the strength of his muscles, the suppleness of his joints, the extreme pliability of his spine, the greater lateral compression of his body, and the slender proportions of his limbs. His prey, on which he darts from his hiding-place, and even pursues up the trees, consists of antelopes, monkeys, and the smaller quadrupeds. Usually, he shuns man, but when closely pressed, he turns upon the hunter, and hunger will drive him to attack, though by stealth, the human race.

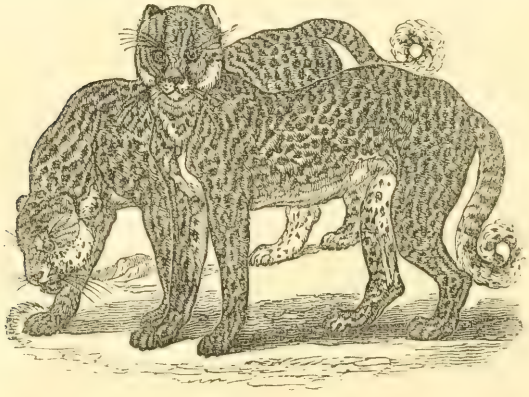
"Even among the cats," says Mr Bennett, "he is remarkable for extreme sleekness and excessive agility. He is well distinguished from all the other species, by the vividness of his coloring, and the beauty of his mark-

[1] *Felis leopardus*, Lin.

rings. These consist of numerous rows of large rose-like spots, passing along his sides, each formed of the confluence of several smaller black spots into an irregular circle enclosing a fawn colored centre, upon a general ground color of light yellow. On his head, neck, and limbs, and the central line of his back, the spots run into one another so completely, as to form full patches of smaller size than the open roses, and without central yellow. The under parts of his body, as is usual in most quadrupeds, become gradually of a lighter hue, the throat, chest, and abdomen being of a pure and delicate white. His tail is equal in length to the entire body, excluding the head; and is marked by a continuation of the open roses of the sides, which become, towards its extremity, separated in such a manner as to surround the upper surface with partial rings of black alternating with white. The whiskers are long and white, and implanted in a series of black lines which traverse his lips."

In captivity, the leopard has been sometimes brought to a considerable degree of tameness. It is not, however, very safe to trust them; for their original nature is now and then unexpectedly displayed. The female leopard in the Tower is extremely tame, suffers herself to be patted by the keeper, and licks his hands. She has a curious propensity to destroy such articles of dress as she can seize; and has torn to pieces hundreds of parasols, umbrellas, muffs, and hats, which the owners unwarily suffered to come within reach of her sudden and agile spring.

THE CHETAH, OR OUNCE.[1]



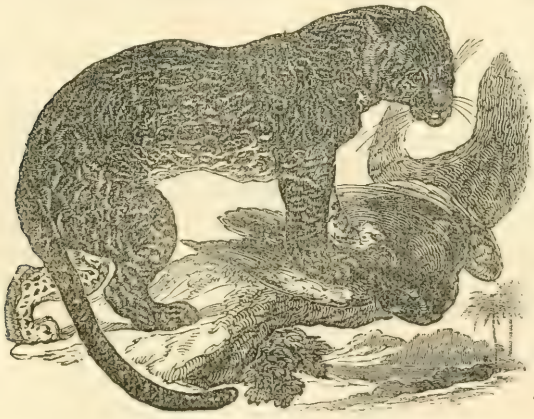
This animal, which is called the youze in Persia, the chetah in India, and to which Pennant gave the name of the *hunting leopard*, is a native of Africa

[1] *Felis uncia*, Gmelin.

and Southern Asia. With the distinguishing characteristics of the cat species, it combines somewhat of the dog. Unlike those of the cat, its claws are only slightly retractile. In size he is intermediate between the leopard and the hound, but has a slenderer body, more elevation in his legs, and a less flat forepart of the head than the former, while he wants the graceful and lengthened form of head and body by which the latter is distinguished. His fur is not sleek, but has a peculiar crispness. Above, the ground color is a bright yellowish fawn; beneath, it is a pure white; the back and sides are covered with innumerable spots, close to each other, from half an inch to an inch in diameter. The spots are larger, but less closely set, on the back than on the head, sides, and limbs. On the chest and under part of the body they are wanting. The tail is marked with interrupted rings of them, till near the extremity, which is surrounded by three or four complete rings. Along the back of the neck, and the anterior part of the spine, is a mane, consisting of longer, crisper, and more upright hairs.

In the east he is used in hunting by the higher classes. Hiding himself as much as possible, he approaches the object, and when he has come sufficiently near it, he makes five or six enormous bounds, with incredible velocity, darts on his victim, and instantly strangles him. In his domesticated state, the chetah is one of the most playful and fond of animals. He has not the slightest appearance of the caprice and mischievousness of the cat.

THE OCELOT.[1]



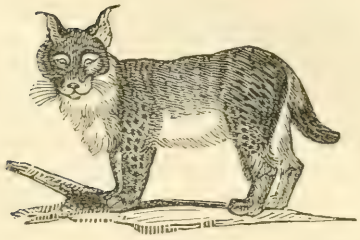
In describing the ocelot, serious mistakes have been committed by Buffon and other naturalists. It is to Mr Bennett that we are indebted for the

[1] *Felis pardalis*, Lin

latest and most accurate description of this animal. "Nearly equal in size to the lynx of Europe," says he, "but shorter in its proportions and more graceful in its form, it holds, as it were, a middle station between the leopard and the domestic cat. Its body, when full grown, is nearly three feet in length, and its tail rather more than one; while its medium height may be reckoned at about eighteen inches. The ground color of its fur is gray, mingled with a slight tinge of fawn, and on this it is elegantly marked with numerous longitudinal bands, the dorsal one being continuous and entirely black, and the lateral, to the number of six or seven on each side, consisting, for the most part, of a series of elongated spots with black margins, sometimes completely distinct, and sometimes running together. The centre of each of these spots offers a deeper tinge of fawn than the ground color external to them; and this deeper tinge is also conspicuous on the upper part of the head and neck, and on the outside of the limbs, all of which parts are irregularly marked with full black lines and spots of various sizes. From the top of the head, between the ears, there pass backwards, towards the shoulders, two, or more frequently four, uninterrupted diverging bands, which are full black anteriorly, but generally bifurcate posteriorly, and enclose a narrow fawn colored space within a black margin; between these there is a single longitudinal, somewhat interrupted narrow black line, occupying the centre of the neck above. The ears are short and rounded, and externally margined with black, surrounding a large central whitish spot. The under parts of the body are whitish, spotted with black, and the tail, which is of the same ground color with the body, is also covered with blackish spots. The tail of the specimen in the Tower does not exceed six or seven inches, but, as it ends abruptly, it has, in all probability, been shortened by some accident."

The animal in the Tower was sent from Trinidad, under the name of the Peruvian tiger. It is extensively spread over the American continent, being found in the widely separated regions of Mexico and Paraguay, where it abides in the depths of the forests during the day, and gives chase at night to birds and small quadrupeds. As it is an active climber, it follows the birds even to their nests. "It is easily tamed," says Mr Bennett, "but seldom loses all trace of its natural ferocity. D'Azara, however, speaks of one which was so completely domiciliated, as to be left at perfect liberty; it was strongly attached to its master, and never attempted to make its escape."

THE LYNX[1]



Is an animal more commonly found in cold than in temperate climates; and is, at least, very rare in hot ones. Bory St Vincent, however, assures us that he shot several in Spain. It is abundant in the northern parts of Europe, Asia, and America. The lynx of the Greeks and Romans was not the animal which now bears that name, but the caracal.

The lynx, of which the ancients have said, that the sight was so sharp as to penetrate opaque bodies, and of which the urine was made to possess the marvellous property of hardening into a solid substance, a precious stone called *lapis lyncurius*, is an animal which never existed, any more than all the properties attributed to it, but in fable. To the present lynx, or to the caracal, this imaginary one has no affinity, but in name. We must not, therefore, as the generality of naturalists have hitherto done, attribute to the former, which is a real being, the properties of this imaginary one, the existence of which Pliny himself does not seem disposed to believe, since he speaks of it only as an extraordinary beast, and classes it with the sphinx, the pegasus, and other prodigies, or monsters, the produce of Æthiopia.

The European lynx possesses not the wonderful quality of seeing through walls; but it has bright eyes, a mild aspect, and, upon the whole, an agreeable and lively appearance. Such, however, is its native ferocity, that it is said to be incapable of being subdued. Its urine produces not precious stones, but like the cat, an animal which it nearly resembles, and of which it retains the manners, and even the cleanliness, it covers it over with earth.

The most beautiful skins of the lynx are brought from Siberia, as belonging to the *lupus-cervarius;* and from Canada, as belonging to the *felis-cervarius;* because being, like all other animals of the New Continent, smaller than those of the Old World, in Europe they are compared to a wolf in size, and in Canada to a wild cat.

The lynx has short legs, and is generally about the size of the fox. The ears are erect, and are tipped with a long pencil of black hair. The fur,

[1] *Felis lynx*, Lin.

which is long and thick, is of a pale gray color, with a reddish tinge, and obscurely marked with small dusky spots on the upper parts of the body. The under parts are white. The skin of the male is more beautifully marked than that of the female. It does not walk or run like the wolf in a progressive motion, but leaps and bounds like the cat. It gains its sole subsistence by devouring other animals; and these it will follow to the very tops of trees. Neither can the wild cat, the marten, the ermine, nor the squirrel, escape its pursuit. It also seizes birds, lies in wait for the stag, the roebuck, and the hare, and with one bound often seizes them by the throat. When in possession of its prey, it first sucks the blood of the animal, and then lays open its head, in order to devour the brains. This done, it generally abandons the victim of its fury, goes in search of fresh prey, and is seldom known to return to the former; a circumstance which has given rise to the vulgar remark, that of all animals the lynx has the shortest memory. The skin of this animal changes its color according to the season and the climate. In winter it is in every respect better than it is in summer; and its flesh, like the flesh of all beasts of prey, is not proper to eat.

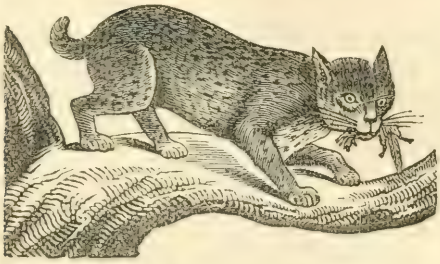
CANADA LYNX.[1]

This is the only species of the genus which exists north of the Great Lakes, and eastward of the Rocky Mountains. It is rare on the sea-coast, and does not frequent the Barren Grounds, but it is not uncommon in the woody districts of the interior, since from seven to nine thousand are annually procured by the Hudson's Bay Company. It is found on the Mackenzie River, as far north as 66°. It is a timid creature, incapable of attacking any of the larger quadrupeds; but well armed for the capture of the American hare, on which it chiefly preys. Its large paws, slender loins, and long, but thick hind legs, with large buttocks scarcely relieved by a short thick tail, give it an awkward, clumsy appearance. It is easily destroyed by a blow on the back with a slender stick; and it never attacks a man. Its gait is by bounds straight forward, with the back a little arched, and lighting on all feet at once. It swims well, but it is not swift on land. It breeds once a year, and has two young at a time. The natives eat its flesh, which is white and tender, but rather flavorless, much resembling that of the American hare.

The early French writers on Canada gave it the name of *Loup Cervier*. The French Canadians now term it indifferently *La Chats*, or *Le Peshoo*. Pennant considered it as identical with the lynx of the Old World; Geoffroy St Hilaire named it as a distinct species; and Temminck has again, under the name of *Felis Borealis*, described the species as the same in both hemispheres.

[1] *Felis Canadensis*, Desm.

BAY LYNX, OR AMERICAN WILD CAT [1]



The common wild cat of North America stands very high upon its legs and has a short tail which is curved upwards at its extremity; which circumstances tend to give the animal an appearance of being somewhat disproportioned. In other respects its physiognomy reminds one strongly of the domestic cat, to which its general aspect and movements are very similar. The residence of the wild cat is usually in woody districts, where it preys upon birds, squirrels, and other small animals, which are taken by surprise, according to the manner of all the animals belonging to the genus *felis*. This animal is about two feet long, and twelve or thirteen inches in circumference. The tail but little exceeds three inches in length. The general color is a deep reddish, mingled with small spots of blackish brown. This animal is occasionally met with in New England, but is more common in Canada and the Western States. It must be distinguished from the wild cats, occasionally shot in our woods, which have sprung from the domestic cat.

THE CARACAL, OR SIYA-GUSH.[2]

Though the caracal resembles the lynx in size, in the formation of the body, and the aspect of the head; and though, like that animal, it seems to have the peculiar, and almost singular characteristic of a stripe of black

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[1] *Felis rufa*, Gmel. [2] *Felis caracal*, Lin.

hair at the extremity of the ears; we do not scruple, nevertheless, from their disagreement in other respects, to treat of them as animals of different species.

The caracal is not spotted like the lynx; it has hair rougher and shorter; its tail is larger, and of a uniform color; its snout is more elongated; in appearance it is less mild, and in disposition it is fiercer. The lynx is an inhabitant of the cold, or at most of the temperate regions; the caracal is only found in hot countries.

The caracal, which is the lynx of the ancients, is common in Barbary, in Arabia, and in the southern half of Asia, and in all those countries which are inhabited by the lion, the panther, and the leopard: like them it depends on prey for its subsistence; but, unlike them, from its inferior size, its inferior strength, to procure that prey, it has much difficulty. Hardly, indeed, has it aught to subsist on, but what the more potent carnivorous animals are disposed to leave for it. It follows the lion, who, when the immediate cravings of his appetite are gratified, is of a disposition altogether unhostile. From the refuse of what this noble animal has devoured, the caracal frequently enjoys a comfortable meal. When, however, he is left to his own powers for support, he attacks hares, rabbits, and birds; of the latter he is exceedingly fond, and will pursue them with astonishing swiftness to the tops of the tallest trees.

The caracal is somewhat larger than a fox, and much fiercer and stronger. It has been known to attack, tear in pieces, and destroy, in a few minutes, a large dog, who, fighting for his life, defended himself with all his strength. It is very difficult to tame this animal; yet if taken when very young, and afterwards reared with care, some affirm that it may be trained to the chase, to which it is by nature inclined, and in which it is sure to succeed, provided it is let loose against such animals only as are its inferiors, and unable to resist it. Should it be a service of danger, with every expression of reluctance it declines it. It is stated that in India they make use of this animal to take hares, rabbits, and even large birds, all of which it surprises, and seizes with singular address and facility. It is, however, doubtful whether the caracal is ever thus employed. In captivity it is extremely sulky, and stares fiercely whenever it is noticed.

THE TIGER CAT OF AFRICA, OR CAPE CAT.[1]

This beautiful animal was erroneously supposed by Buffon to be the same as the serval of India, but we have recently seen a living specimen in Boston, from which the above accurate likeness was taken, and which enables us to testify to the accuracy of the following description from Shaw. "This animal is extremely brilliant in color, it being of the brightest fulvous yellow, with jet black stripes and spots; the chin, throat, and breast, pale ash color; along the back are black stripes; on the sides of the neck, and on the breast, numerous small crescent shaped spots pointing upwards; on the legs numerous roundish spots; and the tail very strongly and distinctly annulated with black and yellow."

The specimen of the cape cat to which we have referred, was certainly one of the most beautiful animals we have ever seen. Its motions were exceedingly quick and graceful, and its countenance mild, lively, and pleasing. Its form was very slender; the head and body not being larger than those of a domestic cat; yet its height and length were nearly twice as great.

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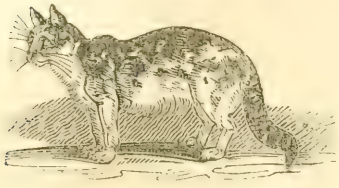
[1] *Felis capensis.*

THE DOMESTIC CAT[1]



Though an animal of prey, is a useful domestic. It is neither wanting in sagacity nor sentiment; but its attachments are stronger to places than to persons. The form of its body corresponds with its disposition. The cat is handsome, light, adroit, cleanly, and voluptuous: he loves ease, and searches out the softest furniture in order to repose on, and rest himself.

Young cats are gay, lively, pretty, and would be very proper to amuse children, if the strokes of their paws were not to be feared. Their disposition, which is an enemy to all restraint, renders them incapable of a regular education. We are told, nevertheless, of the Greek friars of Cyprus having taught cats to hunt, take, catch, and destroy the serpents with which that island was infested; their scent, which in the dog is an eminent quality is far from being good, and therefore they do not pursue animals which they no longer see; they do not hunt, but wait and attack them by surprise.

The most immediate physical cause of this inclination which they have to spy out, and surprise other animals, comes from the advantage which they receive from the particular conformation of their eyes. The pupil, in man, as well as in the greater part of animals, is capable of a certain degree of contraction and dilatation; it enlarges a little when there is no light, and contracts when it becomes too strong.

In the eye of the cat, and of nocturnal birds, this contraction and dilatation are so considerable, that the pupil, which in obscurity is large and round, becomes, in broad day, long and narrow like a line; and for this reason, these animals see better during the night than during the day, the form of the pupil being always round when it is not constrained. During the day, there is a continual contraction in the eyes of the cat, and it is only by effort, as it were, that he sees in a strong light; whereas, at twilight, the pupil resuming its natural form, he sees perfectly, and profits from this advantage, to know, attack, and surprise other animals. The whiskers, too, appear to aid him in the chase, by possessing qualities analogous to those of the antennæ of insects.

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[1] *Felis catus*, Lin.

Cats seem to have a natural dread of water, cold, and bad smells. They are very fond of perfumes, and gladly suffer themselves to be taken and caressed by persons who use them. The scent of *valerian* has so powerful, and so delicious an effect on them, that they appear transported with pleasure by it; and, in order to preserve this plant in gardens, it is common to surround it with a close fence. Cats will smell it from afar, will run and rub themselves against it, and will pass and repass so often over it, as to destroy it in a short time.

One of the most remarkable properties of the domestic cat is, the anxiety with which it makes itself acquainted, not only with every part of its usual habitation, but with the dimensions and external qualities of every object by which it is surrounded. Cats do not very readily adapt themselves to a change of houses; but we have watched the process by which one, whose attachment to a family is considerable, reconciles itself to such a change.

He surveys every room in the house, from the garret to the cellar; if a door is shut, he waits till it be opened to complete the survey; he ascertains the relative size and position of every article of furniture; and when he has acquired this knowledge, he sits down contented with his new situation. It appears necessary to a cat, that he should be intimately acquainted with every circumstance of his position, in the same way that a general first examines the face of the country in which he is to conduct his operations. If a new piece of furniture, if even a large book or portfolio, is newly placed in a room which a cat frequents, he walks round it, smells it, takes note of its size and appearance, and then never troubles himself further about the matter.

This is, probably, an instinctive quality; and the wild cat may, in the same way, take a survey of every tree or stone, every gap in a brake, every path in a thicket, within the ordinary range of its operations. The whiskers of the cat, as we have mentioned in the case of the lion, enable it to ascertain the space through which its body may pass, without the inconvenience of vainly attempting such a passage.

The memory of a cat must be very strong, to enable it to understand this great variety of *local* circumstances, after a single observation. The same power of memory leads this animal, much as its affection may be doubted, to know the faces of individuals. We have seen a cat exhibit manifest delight upon the return of its master, or of a person from whom it had received peculiar kindness. There are several instances of strong attachment to the human race, in cats, though, in number and intensity, they fall short of the attachment of the dog.

Cats appear to possess, in some degree, the power of fascination. "There was at my house, a little while ago, a cat, seen watching a bird upon the top of a tree, and for some time they mutually fixed their eyes upon each other. At length, the bird let herself fall resistless into the cat's claws,

either dazzled and astonished by the force of imagination, or drawn by some attractive power in the cat."

As they are exceedingly clean, and as their coat is always dry and shining, their hair easily electrifies; and sparks are seen to come from it, when rubbed with the hand, in any dark place. Their eyes shine in the dark, almost like diamonds, and reflect outwardly, during the night, the light which they may be said to have imbibed during the day.

Cats may be taught to perform tricks, such as leaping over a stick, but they always do such feats unwillingly. There was an exhibition of cats, in Regent-street, London, where the animals, at the bidding of their master, (an Italian,) turned a wheel, drew up a bucket, rang a bell, and, in doing these things, begin, continue, and stop, as they were commanded. But the *commencez*, *continuez*, *arretez* of their keeper, was always enforced with a threatening eye, and often with a severe blow; and the poor creatures exhibited the greatest reluctance to proceed with their unnatural employments. They had a subdued and piteous look; but the scratches upon their master's arms, showed that *his* task was not always an easy one.

"At Elford, near Litchfield, in England, the Rev. Mr Sawley had taken the young ones from a hare which had been shot. His cat, which had just lost her own kittens, carried them away, as it was supposed, to eat them; but it presently appeared that it was affection, not hunger, which incited her, as she suckled them and brought them up as their mother."

Wild cats, from whence all the domestic varieties have been derived, have been seen in several parts of Africa, as in Guinea, at the Gold Coast; at Madagascar, where the original inhabitants had even domestic cats; at the Cape of Good Hope, where, Kolben says, "there are also, though in a small number, wild cats of a blue color;" and these blue, or rather slate colored cats, are found again in Asia. In Europe, but one species of wild cat is known, and seems to be but little varied by climate.

In England, the wild, or wood cat, is the fiercest and most destructive of predatory animals, and may not improperly be denominated the British tiger. At its full growth, it stands a foot and a half in height, measures nearly two feet round the body, and, including the tail, which is half a yard long, it is about four feet in length. A larger head, more vividly sparkling eyes, and a more agile and daring demeanor, distinguish it from the domestic species. Its color is of a yellowish brown; the head, back, sides, and tail, being marked transversely with bars of deep brown and black. It is a very solitary animal. Merely to wound them is dangerous, as they will turn furiously on their assailant, and they have strength enough to render themselves formidable. In spite, however, of their strength and agility, they are often vanquished by a much smaller enemy. That enemy is the pine marten. The combat between the two animals is well described by the author of a recent valuable work, The British Naturalist. "The onset," says he, "is one of some skill on both sides. The aim of the cat is to

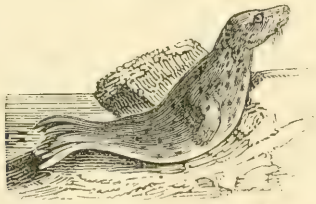
pounce with her paws upon the head of the marten, in such a way that the claws may destroy or wound its eyes, while her teeth are embedded in its neck; and if she can accomplish that, the fate of the marten is decided. That, however, if done at all, must be done in a moment; and if it be lost, there is no repairing the mistake. The spring of the wood cat is larger than that of her opponent, and the cat takes up her position so that she shall, if possible, alight upon his head with her full spring and impetus. To distract her attention, he keeps moving his head from side to side, and if he succeeds in his object, he rushes to close quarters by a side movement If the spring of the cat takes proper effect, there is a struggle, but not of long duration; and it is the same with the opposite result, if the cat miss and the marten fasten, during the short pause of exhaustion after the spring."

A singular animal has recently been discovered in the island of Java, which seems the connecting link between the cat and ferret tribes. It has the lengthened muzzle, and slender body of the latter, with the sheathed and retractile claws of the former. Dr Horsfield denominates it *Prionodon gracilis*.

FAMILY III—AMPHIBIA.

These animals have the feet short, enveloped in the skin, in form of fins; the posterior in the direction of the body; number of incisors variable, often six, and sometimes four above, more generally four, and sometimes two below.

THE SEAL.[1]



This animal has its head round, like that of the human species; its snout is broad, like the otter's; the eyes, large and elevated; little, or no external

[1] *Phoca vitulina*, Lin. The genus *Phoca* has six or four upper and two or four lower incisors; two upper and two lower canines; ten or twelve upper and ten or twelve lower molars. Molars all cutting or conical; five toes on all the feet; tail short; eyes large nostrils closing at the will of the animal; head round; external ears wanting; four abdominal mammæ.

signs of ears, only two auditory passages in the sides of the head; it has whiskers about its mouth, and its teeth somewhat resemble those of the wolf; the tongue is sloped at the point; the body, hands, and feet, covered with a short and bristly hair; it has no legs, but two feet, or membranes, like hands, with five toes, terminated by as many claws. These membranes, which have the appearance of hands, are only larger and turned backwards, as if designed to unite with its very short tail, which they accompany on both sides. The body is thickest where the neck is joined to it, whence the animal tapers down to the tail like a fish. This amphibious creature, though of a very different nature from that of our domestic animals, yet seems susceptible of a kind of education. It is taught to salute persons with its head and its voice; it is accustomed to obey the call of its keeper, and gives many other signs of intelligence and docility.

The sensations of the seal are as perfect, and its sagacity as ready, as those of any other quadruped; both the one and the other are strongly marked by its docility, its social qualities, its strong instinct for its female, its great attention towards its young, and by its voice, which is more expressive and more modulated than in other animals. Its body is likewise firm and large. It is also strong, and armed with very sharp teeth and claws, and has many particular and singular advantages over any other animals we can compare with it. It endures both heat and cold, and feeds indifferently on grass, flesh, or fish. It can equally live on ice, land, or in the water. On account of their remaining so long a time under water, it was supposed that the *foramen ovale* remained open, as in the human fœtus, but it is not so.

But these advantages, which are very great, are counterbalanced by imperfections still greater: they may be said to be deprived of the use of their fore legs, or membranes; they are almost entirely shut up within its body, while nothing appears but the extremities of them, which are furnished with five toes, scarcely moveable, being united together by a very strong membrane, so that they might more properly be called fins than feet, as they are more adapted for the purpose of swimming than walking; the hind feet, indeed, being turned backwards, are entirely useless upon land; so that when the animal is obliged to move, it drags itself forward like a reptile, and with an effort more painful; for it cannot twist itself about like a serpent, but lies like a lump on the earth, and by grasping whatever it finds in its reach, drags itself up the steepest shores, rocks, and shoals of ice: by this method, it moves with such a degree of swiftness, that a man cannot overtake it. It makes its way towards the sea, and often, though wounded, escapes the pursuit of the hunter.

Seals are social animals, and are generally found in great numbers in the places they frequent: their natural climate is the northern, but they are also met with, in the temperate, and even hot countries; for they are seen on the shores of almost all the seas in the universe. The species alone

seem to vary; and, according to the difference of climates, its color changes, and even its shape.

The females of these animals bring forth in winter, and rear their young upon some sand bank, rock, or small island, at some distance from the continent. When they suckle their young, they sit upon their hinder legs, and they continue with their dam for twelve or fifteen days; after which, she brings them down to the water, accustoms them to swim, and get their food by their own industry. As each litter never exceeds above three or four, so the animal's cares are not much divided, and the education of her little ones is soon completed. The young, particularly, distinguish their mother's voice among the numerous bleatings of the old ones, and are perfectly obedient to her call. The time that intervenes, from their birth till they attain their full growth, being many years, the length of their lives must also be very long. Buffon is of the opinion, that these animals live upwards of a hundred years.

The voice of the seal may be compared to the barking of an angry dog. When young, they have a shrill note, somewhat like the mewing of a cat. Those that are taken early from their dams mew continually, and very often die, sooner than take the food that is offered them. These animals, in general, are of a courageous nature. It is remarked, that, instead of being terrified at thunder and lightning, they are rather delighted, generally come on shore in tempests and storms, and even quit their icy abodes to avoid the shock of the tempestuous waves: at such times, they sport in great numbers along the shore; the tremendous conflict seems to divert them, and the heavy rains that fall, appear to enliven them. They have naturally a disagreeable scent, and when there are great numbers together, it is perceived at a great distance.

As they have a prodigious quantity of blood, and are also greatly overloaded with fat, they are consequently of a very dull and heavy nature; they usually sleep soundly, and are fond of taking their repose on flakes of ice, or on the sides of rocks, at which time the hunters approach very near without disturbing them, and this is the usual method of taking them. They are very seldom killed with firearms; for, as they do not immediately die, even if they are shot in the head, they plunge into the sea, and are entirely lost to the hunter. The general method, therefore, is to surprise them when asleep, and knock them on the head.

THE GREENLAND SEAL.[1]

These animals differ considerably in size, being found from four to nine feet long. They also vary in their colors; some being black, others white, some spotted, and many yellow. Their chief food consists of fish, which they are remarkably expert in pursuing and catching. In those places where herrings are seen in shoals, the seals destroy them by thousands; and when these retire, they are obliged to hunt after fish that are stronger and more capable of evading pursuit. They are taken for the sake of their skins and the oil their fat yields. The seal is capable of being tamed, and is said to be fond of music. The Icelanders believe them to be the offspring of Pharaoh, and his host, who were converted into seals on their being overwhelmed in the Red Sea. Were the race of this creature to cease to exist, the Greenlander would be rendered almost unable to inhabit his rigid clime, as it is principally from them that he derives the necessaries of life. There is scarcely a part of them which is not of the highest utility to him.

The manner in which a Greenlander catches a seal, is as follows: The instant a seal is seen, he whispers, *pussee!* (seal,) along the surface of the

water, to the nearest of his companions, who telegraphs the signal till all the boats are engaged in the chase; and it is seldom possible for their prey to escape. The seal is impetuous in disposition, and having once discovered his pursuers, he dives repeatedly, and in different directions, to confound them; but becomes at length so short breathed by his hurry, that he cannot remain long out of sight; and, as the *uskees* are around at various points watching the favorable moment, one of them paddles silently in his rear, using the paddle with one hand, while with the other he is getting his tackle in order; and having advanced near enough, for he is sure to measure

[1] *Phoca Groenlandica*, Mull.

the distance with accuracy, he flings the dart, and never fails to strike. The seal, terrified and wounded, dives in the greatest terror; but a float being attached to the dart by a leathern line, he is soon forced up again and despatched.

European and American ships are sent to the high northern latitudes to procure the oil and skins of seals, which are of extensive importance in commerce and manufactures.

One mode of killing the seal, is to go to the caves on shore, into which herds of seals occasionally enter. When the sealers are properly placed, they raise a simultaneous shout, at which the affrighted animals rush out in great confusion, and are dispatched with wonderful quickness, by a single blow on the nose, struck with a club. They are very tenacious of life when struck or wounded on any other part of the body.

The best situation for *sealing* in the Arctic seas, is stated by Scoresby, to be in the vicinity of Jan Mayen's Island; and the best season, the months of March and April. When the boats arrive at the ice, the sealers immediately attack the animals with clubs, and stun them by a single blow over the nose, which mode enables one person to destroy a large number of seals; when they are seen on pieces of drift ice they are hunted by means of boats, each boat pursuing a different herd; should the seals attempt to leave the ice before the arrival of the boat, the sealers shout as loudly as possible, and produce such amazement in the seals by this uproar, as to delay their flight till the boat arrives and the work of destruction is begun. Where the seals are very numerous, the sealers stop not to flay those they have killed, but set off to another ice field to kill more, merely leaving one man behind to take off the skins and fat. When the condition of the ice forbids the use of boats, the hunter is obliged to pursue the seals over it, jumping from piece to piece, until they succeed in taking one, which he then stops to flay and *flense*, or to remove the skin and fat. This sometimes is a horrible business, since many of the seals are merely stunned, and occasionally recover after they have been flayed and flensed. In this condition, too shockingly mangled for description, they have been seen to make battle and even to swim off.

The number of seals destroyed in a single season, by the regular sealers, may well excite surprise. One ship has been known to obtain a cargo of four or five thousand skins, and upwards of a hundred tons of oil. Whale ships have accidently fallen in with and secured two or three thousand of these animals during the month of April. The sealing business is, however, very hazardous when conducted on the borders of the Spitzbergen ice. Many ships, with all their crews, are lost by the sudden and tremendous storms occurring in those seas, where the dangers are vastly multiplied by the driving of immense bodies of ice. In one storm that occurred in the year 1774, no less than five seal ships were destroyed in a few hours, and six hundred valuable seamen perished

THE FETID SEAL.[1]

This seal, when full grown, is about four feet and a half long, and its skin is covered with a dingy white hair, composed of stiff bristles and soft hair. The old animals are remarkably fetid, and this nauseous odor taints their flesh and fat equally. The fetid seal frequents the fixed ice near frozen lands, and never relinquishes its haunts when old. It has holes in the ice for the purpose of fishing, and is solitary in its habits, pairs being rarely seen together. It is not a timid animal, and is occasionally preyed upon by the eagle, being taken while asleep upon the surface.

THE SEA LION, OR ELEPHANT SEAL.[2]

To the species of seals, as above described, we may, with great propriety, add another animal, described in Anson's Voyages, by the name of the *sea lion*. It is found in great numbers on the coasts of the South Sea. The sea lion resembles the sea calf, which is very common in the same latitude; but they are much larger than any of the former, being from eleven to eighteen feet long, and from eight to eleven in circumference. It is so fat, that when the skin is taken off, the blubber is about a foot thick all round the body. About ninety gallons of oil is drawn from one of these animals; they are at the same time very full of blood, and when deeply wounded in many parts of the body, the blood spouts out with amazing power; the throat of one of these animals being cut, it afforded two barrels of blood, besides what then remained in its body. Its skin is covered with a short hair of a brownish color, but blackish on the tail and feet: their toes are united by a membrane which does not reach to their extremity; each of the toes is known by a claw. The sea lion differs from the seal, not only in its size and bulk, but also in some other characters; the male has a kind of thick comb or trunk hanging from the end of the upper jaw, about five or six inches long, which becomes inflated when the animal is angry. This character is not seen in the female. The strongest males collect together a flock of females, and hinder the others from approaching them. These animals are truly amphibious; they remain all the summer in the sea, and go on shore in the winter, at which season the females bring forth their young, but never above one or two at a litter, which they suckle, like the seal.

The sea lions, while they are on shore, feed on the grass by the side of the sea; they are of a very heavy and drowsy nature, and delight to sleep in the mire; but they are very wary, and at those times commonly fix some as sentinels near the place where they sleep; and it is said, that these senti-

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[1] *Phoca fœtida*, Mull.

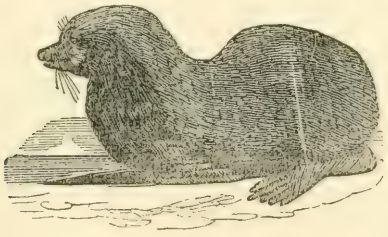
[2] *Phoca ansonii*, Desm.

nels are very careful to awake them when any danger is near. Their voices are very shrill, and of various tones; sometimes grunting like hogs, and sometimes neighing like horses. The males often fight with each other, when they wound one another desperately with their teeth. The flesh of these animals is not disagreeable to eat, particularly the tongue, which is as good as that of the ox. They are very easily killed, as they cannot defend themselves, nor fly from their enemies; they are so exceedingly heavy, that they move with great difficulty, and turn themselves about with still greater. Those that hunt them have only to guard against their teeth, which are very strong, and which they make use of with powerful effect on those who approach within their reach.

THE HOODED SEAL.[1]

The hooded seal is most commonly found on the shores of Greenland, of Davis' Straits, and occasionally of Newfoundland. It is distinguished by the singular appendage it has on its head, formed by an extension of the skin of the front which communicates with the nostrils, and can be inflated, or elevated and depressed, at the pleasure of the animal. It is covered with short black hairs. The use of this hood has not been ascertained.—*Godman.*

THE URSINE SEAL, OR SEA BEAR.[2]



The males of this species are, in general, about eight feet long, but the females are much smaller. Their bodies are very thick, and the color of the hair is commonly black, but that of the old ones is tipped with gray. The females are of an ash colored hue. The nose projects like that of a pug dog, and the eyes are large and prominent. Their voice varies on different occasions; thus, when sporting on their native rocks, they low like a cow; when engaged in battle, they growl hideously; after a defeat or receiving a wound, they mew like a cat; and the note of triumph after a

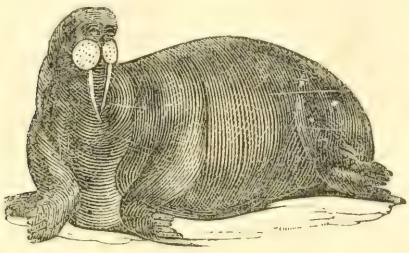
[1] *Phoca cristata*, Gm.

[2] *Phoca ursina*, Lin.

victory somewhat resembles the chirping of a cricket. These animals are chiefly found on the islands in the vicinity of Kamtschatka, from June to September; after which they remove, some to the Asiatic, and some to the American coast. On Behring's Island they are so numerous as almost to cover the whole shore; but it is a singular fact, that they only frequent that part of it which lies towards Kamtschatka.

Ursine seals live in families, each male being surrounded by from eight to fifty females, whom he watches with the most vigilant jealousy, and treats in the most tyrannical manner. They are of an irritable disposition, and have frequent battles. So tenacious are they of life, that they will live a fortnight after receiving wounds which would be speedily mortal to other animals.

THE WALRUS, OR MORSE.[1]



The name of sea cow, or sea horse, by which the walrus is most generally known, has been very wrongly applied; since the animal which it denotes has not the least resemblance to the land animals of that name: the denomination of sea elephant, which others have given it, is much better imagined, as it is founded on a singular and very apparent character. The walrus, like the elephant, has two large ivory tusks, weighing from ten to thirty pounds each, which shoot from the upper jaw; its head also is formed, or rather deformed, like that of the elephant, and would entirely resemble it in that part if it had a trunk; but the walrus is deprived of that instrument, which serves the elephant in the place of an arm and hand, and has real arms to make use of. These members, like those of the seal, are shut up within the skin, so that nothing appears outwardly but its hands and feet: its body is long and tapering, thickest towards the neck: the

[1] *Trichecus rosmarus*, Gmel. The genus *Trichecus* has two upper and no lower incisors; two upper and no lower canines; ten upper and ten lower molars; incisors small, deciduous; superior canines or tusks large, longer than the head, compressed laterally; molars cylindrical, crown truncated obliquely; body elongated; head round; muzzle large; no external ears; tail very short; fore feet like fins, with five toes; hind feet horizontal; toes enveloped in the skin.

whole body is clothed with a short hair; the toes, and the hands, or feet, are covered with a membrane, and terminated by short and sharp pointed claws. On each side of the mouth are large bristles in the form of whiskers: its tongue is hollowed, the concha of the ears are wanting, &c.; so that, excepting the two great tusks, and the cutting teeth, which it is deficient in above and below, the walrus in every other particular perfectly resembles the seal: it is only much larger and stronger, being commonly from twelve to sixteen feet in length, and eight or nine in circumference, and sometimes reaching eighteen feet in length, with a proportionable girth; whereas the largest seals are no more than seven or eight feet. The walrus, also, is generally seen to frequent the same places as the seals are known to reside in, and are almost always found together. They have the same habitudes in every respect, excepting that there are fewer varieties of the morse than of the seal: they likewise are more attached to one particular climate, and are rarely found except in the northern seas.

"There was formerly," says Zordrager, "great plenty of morses and seals in the bays of Horisont and Klock, but at present there are very few. Both these animals quit the water in the summer, and resort to the neighboring plains, where there are flocks of them from eighty to two hundred, particularly morses, which will remain there several days together, till hunger obliges them to return to the sea. This animal externally resembles the seal, but it is stronger and much larger: like that, it has five toes to each paw, but its claws are shorter, and its head thicker and rounder; its skin is thick, wrinkled, and covered with very short hair of different colors; its upper jaw is armed with two teeth about half an ell or an ell in length; these tusks, which are hollow at the root, become larger as the animal grows older. Some of them are found to have but one, the other being torn out in fighting, or perhaps fallen out through age. This ivory generally brings a greater price than that of the elephant, as it is of a more compact and harder substance. The mouth of this animal is like that of the ox, and furnished with hairs which are hollow, pointed, and about the thickness of a straw. Above the mouth are two nostrils, through which the animal spouts the water like a whale. There are a great number of morses towards Spitzbergen, and the profit that is derived from their teeth and fat fully repays the trouble of taking them, for the oil is almost as much valued as that produced from the whale. When the hunter is near one of these animals in the water, or on the ice, he darts a very strong harpoon at it, which, though made expressly for the purpose, often slips over its hard and thick skin; but if it has penetrated into it, they haul the animal towards the boat, and kill it with a sharp and strong lance. The morse is generally heavier than the ox, and as difficult to pursue as the whale, the skin of which is more easily pierced. For this reason, they always endeavor to wound it in the most tender part, and aim at its eyes: the animal, obliged by this motion to turn its head, exposes its breast to the hunter,

who immediately strikes very forcibly in that part, and draws the lance out again as quick as possible, for fear it should seize the lance with its teeth, and wound those that attack it. Formerly, before these animals were so greatly persecuted, they advanced so far on shore, that when it was high water, they were at a great distance from the sea; and at low water, being at a still greater, the hunters easily approached them and killed great numbers. The hunters, in order to cut off their retreat to the sea, and after they had killed several, made a kind of barrier of their dead bodies, and in this manner often killed three or four hundred in a season. The prodigious quantity of bones spread over the shores, sufficiently proves how numerous these animals were in former times. When they are wounded, they become extremely furious, often biting the lances in pieces with their teeth, or tearing them out of the hands of their enemies; and when at last they are strongly engaged, they put their head betwixt their paws, or fins, and in this manner roll into the sea. When there is a great number together, they are so bold as to attack the boats that pursue them, bite them with their teeth, and exert all their strength to overturn them."

Captain Cook saw a herd of them floating on an ice island off the northern coasts of the American continent. "They lie," says he, "in herds of many hundreds, upon the ice, huddling over one another like swine; and roar or bray so loud, that in the night, or in foggy weather, they gave us notice of the vicinity of the ice before we could see it. We never found the whole herd asleep, some being always on the watch. These, at the approach of the boat, would wake those next to them; and the alarm being thus gradually communicated, the whole herd would be awaked. But they were seldom in a hurry to get away, till after they had been once fired at. They then would tumble over one another into the sea, in the utmost confusion. And if we did not, on the first discharge, kill those we fired at, we generally lost them, though mortally wounded. Vast numbers of these animals would follow and come close up to the boats; but the flash of a musket in the pan, or even the pointing of a musket at them, would send them down in an instant. The female walrus will defend her offspring to the very last, and at the expense of her own life, whether in the water or upon the ice. Nor will the young one quit the dam, though she be dead; so that, if one be killed, the other is a certain prey."

We find the walrus can live, at least for some time, in a temperate climate. We do not know how long it goes with young, but if we judge by the time of its growth and size, we must suppose it to be upwards of nine months. It cannot continue in the water for a long time together, and is obliged to go on shore to suckle its young, and for other occasions. When they meet with a steep shore, or pieces of ice to climb up, they make use of their tusks to hold by, and their feet to drag along the heavy mass of their body. They are said to feed upon the shell-fish which are at the bottom of the sea, and to grub them up with their strong tusks. Others

say, that they live on the broad leaves of a certain vegetable which grows in the sea, and that they eat neither flesh nor fish. But I imagine all these opinions have but a weak foundation; and there is reason to think, that the walrus, like the seal, lives on prey, especially herrings and other fish; for it does not eat at all when upon land, and it is chiefly hunger which obliges it to return to the sea.

The fat of the walrus furnishes from one to two barrels of oil; and the skin is capable of being manufactured into a strong and elastic leather.

ORDER FIVE—MARSUPIALIA.

Animals of this order have teeth different in the different genera. The young are brought forth prematurely, often into a pouch formed by a fold of the skin of the abdomen of the females, inclosing the mammæ; marsupial bones in both sexes; thumb of the hind feet sometimes wanting, sometimes very distinct, without nail, opposable to the other toes.

THE VIRGINIAN OPOSSUM.[1]

The opossum is found in Brazil, Guiana, Mexico, Florida, Virginia, and other temperate regions of this continent. The female has under the belly a large cavity, where she receives and suckles her young; she produces often, and a great number of young each time, most authors say, four or five, others six or seven.

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[1] *Didelphis Virginiana*, Penn. The genus *Didelphis* has ten upper and eight lower incisors; two upper and two lower canines; twelve or fourteen upper and fourteen lower molars. Two superior intermediate incisors larger than the others; lower incisors equal; canines strong, compressed molars, the three first in the upper jaw triangular; the others crowned with points; head long and conical; muzzle pointed, mouth much cleft; ears large, rounded and almost naked; five toes on all the feet; nails long and bent; hind feet plantigrade with the thumbs opposable, but destitute of nails; tail long, scaly, mostly deprived of hair.

The young opossums stick to the paps of the mother till they have acquired strength enough, and a sufficient growth to move easily.

The latest and fullest account of the manners and habits of the opossum, is given by Dr Godman. "The opossum," says he, "is very remarkable from other peculiarities, besides those which relate to the continuation of its kind. In the first place, it has a very large number of teeth, (no less than fifty,) and its hind feet are actually rendered hands, by short, fleshy, and opposable thumbs; which, together with the prominences in the palms of these posterior hands, enable the animal to take firm hold of objects which no one would think could be thus grasped. An opossum can cling by these *feet* hands, to a smooth silk handkerchief, or a silk dress, with great security, and climb up by the same. In like manner, he can ascend by a skein of silk, or even a few threads. The slightest projection, or doubling, of any material, affords him a certain mean of climbing to any desired height. Another curious and amusing peculiarity, is his prehensile tail; by simply curving this at the extremity, the opossum sustains his weight, and depends from the limb of a tree, or other projecting body, and hanging in full security, gathers fruit, or seizes any prey within his reach; to regain his position on the limb, it is only necessary to make a little stronger effort with the tail, and throw his body upward at the same time.

"In speaking of the more obvious peculiarities of the opossum, we may advert to the thinness and membranous character of the external ears, which may remind us, in some degree, of what has been heretofore said relative to the perfection of the sense of touch possessed by the bat, in consequence of the delicacy of the extended integument forming the ears and wings. The extremity of the nose of our animal is also covered with a soft, moist, and delicate integument, which is, no doubt, very sensitive. On the sides of the nose, or rather on the upper lip, there are numerous long and strong divergent whiskers, or bristles, projecting to the distance of nearly three inches; over each eye, there are two long, black bristles, rather softer than the others, somewhat crisped, or undulated, and slightly decurved; while, on the posterior part of the cheek, and about an inch below and in front of the ear, there is a bunch of long, straight bristles, (very similar to those of a hog,) six or eight in number, projecting laterally, so as to form a right angle with the head. When the elongated conical form of the opossum's head is recollected, together with its nocturnal habits, we cannot avoid remarking, that all these arrangements appear to have immediate reference to the safety of the animal, furnishing the means of directing its course, and warning it of the presence of bodies which otherwise might not be discovered until too late.

"The mouth of the opossum is very wide when open, yet the animal does not drink by lapping, but by suction. The wideness of the mouth is rendered very remarkable, when the female is approached, while in company with her young. She then silently drops the lower jaw to the greatest dis-

tance it is capable of moving, retracts the angles of the lips, and shows the whole of her teeth, which thus present a formidable array. She then utters a muttering kind of snarl, but does not snap, until the hand, or other object, be brought very close. If this be a stick, or any hard or insensible body, she seldom closes her mouth on it after the first or second time, but maintains the same gaping and snarling appearance, even when it is thrust into her mouth. At the same time, the young, if they have attained any size

either exhibit their signs of defiance, take refuge in the pouch of the mother, or, clinging to various parts of her body, hide their faces amidst her long hair.

"The general color of the opossum, is a whitish gray. From the top of the head, along the back, and upper part of the sides, the gray is darkest; and this color is produced by the intermixture of coarse white hairs, upwards of three inches long, with a shorter, closer, and softer hair, which is white at base, and black for about half an inch at tip. The whole pelage (fur,) is of a woolly softness, and the long white hairs, diverging considerably, allow the back parts to be seen, so as to give the general gray color already mentioned. On the face the wool is short, and of a smoky white color; that on the belly is of the same character, but is longer on the fore and hind legs; the color is nearly black from the body to the digits, which are naked beneath. The tail is thick and black, for upwards of three inches at base, and is covered by small hexagonal scales, having short rigid hairs interspersed throughout its length, which are but slightly perceptible at a little distance. The opossum is generally killed for the sake of its flesh and fat. Its wool is of considerable length and fineness, during the winter season, and we should suppose, that in manufactures it would be equal to the sheep's wool which is wrought into coarse hats.

"The opossum is a nocturnal and timid animal, depending for his safety more on cunning than strength. His motions are slow, and his walk, when

on the ground, entirely plantigrade, which gives an appearance of clumsiness to his movements. When on the branches of trees, he moves with much greater ease, and with perfect security from sudden gusts of wind; even were his weight sufficient to break the limb on which he rests, there is no danger of his falling to the earth, unless when on the lowest branch, as he can certainly catch, and securely cling, to the smallest intervening twigs, either with the hands or the extremity of the tail. This organ is always employed by the animal, while on the smaller branches of trees, as if to guard against such an occurrence, and it is very useful in aiding the opossum to collect his food, by enabling him to suspend himself from a branch above, while rifling a bird's nest of its eggs, or gathering fruits.

"The food of the opossum varies very much, according to circumstances. It preys upon birds, various small quadrupeds, eggs, and, no doubt, occasionally upon insects. The poultry yards are sometimes visited, and much havoc committed by the opossum, as, like the weasel, this animal is fonder of cutting the throats and sucking the blood of a number of individuals, than of satisfying his hunger by eating the flesh of one. Among the wild fruits, the persimon, (*Diospyros Virginiana*,) is a great favorite, and it is generally after this fruit is in perfection, that the opossum is killed by the country people for the market. At that season it is very fat, and but little difference is to be perceived between this fat and that of a young pig. The flavor of the flesh is compared to that of a roasted pig: we have, in several instances, seen it refused by dogs and cats, although the opossum was in fine order, and but recently killed. This may have been owing to some accidental circumstance, but it was uniformly rejected by these animals, usually not very nice when raw flesh is offered.

"The hunting of the opossum is a favorite sport with the country people, who frequently go out with their dogs at night, after the autumnal frosts have begun, and the persimon fruit is in its most delicious state. The opossum, as soon as he discovers the approach of his enemies, lies perfectly close to the branch, or places himself snugly in the angle where two limbs separate from each other. The dogs, however, soon announce the fact of his presence, by their baying, and the hunter, ascending the tree, discovers the branch upon which the animal is seated, and begins to shake it with great violence, to alarm, and cause him to relax his hold. This is soon effected, and the opossum, attempting to escape to another limb, is pursued immediately, and the shaking is renewed with greater violence, until at length the terrified quadruped allows himself to drop to the ground, where hunters, or dogs, are prepared to dispatch him.

"Should the hunter, as frequently happens, be unaccompanied by dogs when the opossum falls to the ground, it does not immediately make its escape, but steals slowly and quietly to a little distance, and then gathering itself into as small a compass as possible, remains as still as if dead. Should there be any quantity of grass or underwood near the tree, this

apparently simple artifice is frequently sufficient to secure the animal's escape, as it is difficult by moonlight, or in the shadow of the tree, to distinguish it; and if the hunter has not carefully observed the spot where it fell, his labor is often in vain. This circumstance, however, is generally attended to, and the opossum derives but little benefit from his instinctive artifice.

"After remaining in this apparently lifeless condition for a considerable time, or so long as any noise indicative of danger can be heard, the opossum slowly unfolds himself, and creeping as closely as possible upon the ground would fain sneak off unperceived. Upon a shout, or outcry, in any tone, from his persecutor, he immediately renews his deathlike attitude and stillness. If then approached, moved, or handled, he is still seemingly dead, and might deceive any one not accustomed to his actions. This feigning is repeated as frequently as opportunity is allowed him of attempting to escape, and is known so well to the country folks, as to have long since passed into a proverb: 'He is playing *possum*,' is applied with great readiness by them, to any one who is thought to act deceitfully, or wishes to appear what he is not.

"The usual haunts of the opossum, are thick forests, and their dens are generally in hollows of decayed trees, where they pass the day asleep, and sally forth, mostly after nightfall, to seek food. They are occasionally seen out during daylight, especially when they have young ones of considerable size, too large to be carried in the maternal pouch. The female then offers a very singular appearance, as she toils along with twelve or sixteen cubs, nearly of the size of rats, each with a turn of his tail round the root of the mother's, and clinging to her back and sides with paws, hands, and mouth. This circumstance was thought distinctive of another species, hence called *dorsigera*, but is equally true of the common or Virginian opossum. It is exceedingly curious and interesting to see the young, when the mother is at rest, take refuge in the pouch, whence one or two of them may be seen peeping out, with an air of great comfort and satisfaction. The mother in this condition, or at any time in defence of her young, will make battle, biting with much keenness and severity, for which her long canine teeth are well suited.

"If taken young, the opossum is generally tamed, and becomes very fond of human society, in a great degree relinquishes its nocturnal habits, and grows troublesome from its familiarity. We have had one thus tamed, which would follow the inmates of the house with great assiduity, and complain with a whining noise when left alone. As it grew older, it became mischievous, from its restless curiosity, and there seemed to be no possibility of devising any contrivance effectually to secure it. The same circumstance is frequently remarked by persons who have attempted to detain them in captivity; and of the instances which have come to our knowledge, where even a great number were apparently well secured, they have all in a short

time enlarged themselves, and been no more heard of. In some such instances these animals have escaped in the city, and for a long time have taken up their quarters in cellars, where their presence has never been suspected, as during the day they remained concealed. In this way it is very probable that many are still living in the city of Philadelphia obtaining a plentiful food by their nightly labors."

THE CAYOPOLLIN, OR MEXICAN OPOSSUM,[1]

Is a small animal, a little larger than a rat, very much resembling the opossum in the snout, the ears, and the tail, which is thicker and stronger than that of a rat; he makes use of it as we do our hands; he has thin transparent ears; the belly, the legs, and feet white. The young, when they are frightened, embrace the mother, who lifts them up on the trees. This species has been found on the mountains of New Spain.

THE MARMOSE, OR MURINE OPOSSUM,[2]

Resembles, in most respects, the Virginian; they are natives of the same climate, in the same continent, and are very much alike by the form of the body, the conformation of the feet, and the tail, a part of which is covered with scales, the upper part only being hairy. But the marmose is smaller than the common opossum, his snout is still sharper; the female has no bag under the belly, she has only two loose skins near the thighs, between which the young place themselves to stick to the paps. When the young are brought forth, they are not so large as small beans; they then stick to the paps. The brood of the marmose is very numerous; we have seen ten small marmoses, each sticking to a pap, and the mother had still four more paps. It is probable that these animals bring forth a few days after conception. The young are then fœtuses only, which are not come to the fourth part of their growth.

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[1] *Didelphis cayopollin*, Lin.

[2] *Didelphis murina*, Lin.

THE KANGUROO.[1]

There exists several species of the kanguroo, all of which are natives of New Holland. The principal of these, is the great kanguroo, which was first discovered in 1770, by some of the persons who accompanied Captain Cook. It often measures nine feet in length, from the tip of the nose to the end of the tail; and, when full grown, weighs two hundred pounds. The head and neck are very small, while the lower parts gradually dilate to a very great size; the fore legs are hardly nineteen inches long, while the hinder ones, which are perfectly bare, and callous beneath, measure three feet seven inches. The head bears some resemblance to that of the deer, having a mild and placid visage; the ears are moderately large and erect, the eyes full, and the mouth rather small. The general color is a pale brown, inclining to white underneath. From the great difference in length of the fore and hind legs, the pace of this animal consists in vast springs, or bounds, which are said at times to exceed twenty feet in length. It can with ease leap over an obstacle above nine feet high. In its state of rest, it sits erect on the whole length of the hind feet, supporting itself by the base of the tail; which is occasionally used as a weapon of defence, and is of such prodigious strength as to be able to break the leg of a man at a single blow. The female seldom produces more than one young one at a birth, which, when first brought forth, is not above an inch long, and is received into an

[1] *Kangurus labiatus*, Geoff. The genus *Kangurus* has six upper and two lower incisors; no canines; ten upper and ten lower molars. Ears large, pointed; eyes large; fore legs very short, with five toes, and strong nails; hind legs long, robust, with four toes; the two internal, united and small; the central large, with a strong claw, like a hoof, plantigrade; tail very strong, with powerful muscles, not prehensile, but serving for locomotion; an abdominal pouch.

abdominal pouch, that the female is furnished with, which conceals the teats, and serves as a receptacle to secure the young in time of danger.

The habits of the kanguroo have been recently described, with equal animation and fidelity, by Mr Cunningham, in his amusing and valuable account of his Two Years' Residence in New South Wales.

"Our largest animals," he says, "are kanguroos; all of which are fine eating, being clear of fat except about the tail, tasting much like venison, and making most delicious stews and steaks, the favorite dish being what is called a steamer, composed of steaks, and chopped tail, with a few slices of salt pork, stewed with a very small quantity of water, for a couple of hours in a close vessel. We have the forest kanguroo, of a gray color, with a longish fur, inhabiting the forests; the wallaroo, of a blackish color, with a coarse shaggy fur, inhabiting the hills; and the red kanguroo, with smooth, short, close fur, of a reddish color (resembling considerably in fineness and texture the fur of the sea otter,) inhabiting the open forests; and all of these varieties attain the weight of two hundred pounds and upwards when full grown. The wallabee and paddymalla grow to about sixty pounds each, and inhabit the bushes and broken hilly country. The rock kanguroo is very small, living among the rockiest portions of the mountains; while the kanguroo rat, or, more properly, rabbit, is about the size of the smallest of the latter kind of animal, and lodges in hollow trees, hopping along, like the other kanguroos, with great speed, and affording good sport in the chase. The kanguroos make no use of their short fore legs except in grazing, when they rise upon them and their tail, bring their hind legs forward, and go nibbling upon all fours, pulling up occasionally some favorite plant with their fore paw, and sitting up bold and erect upon their hind houghs and tail, while they slowly bite and nibble it, shifting it from paw to paw, like a boy protracting his repast on a juicy apple. When chased, they hop upon their hind legs, bounding onwards at a most amazing rate, the tail wagging as they leap, and serving them for a balance. They will bound over gullies, and down declivities, the distance of thirty yards, and fly right over the tops of low brushwood; so that, in such places, dogs stand very little chance with them; but in a clear open country soon tire them out. The dogs seize them generally by the hip, and throw them over; then fasten upon their throats and finish them. But few dogs will attack a large kanguroo singly, some of the two hundred weight size often hopping off with three or four assailants hanging about them; and I was informed of one that actually carried a man to some distance. When a dog gets up close to a large kanguroo, it will often sit upon its tail and haunches, and fight the dog, turning adroitly round and round, so as always to face him, and pushing him off with the fore paws; or it will seize and hug him like a bear, ripping him up with the long sharp claw on its powerful hind leg. They are constantly indeed cutting, and often killing, dogs with this terrible weapon, which will tear out the bowels at a single kick; and a large kanguroo is on this ac-

count, very dangerous even for a man to approach, when set at bay. The kanguroo hunters immediately hamstring them when thrown, to prevent injury to themselves or the dogs; while the black natives give them a heavy blow over the loins with their waddie, which completely paralyzes their hind legs, as all the large nerves supplying these parts pass out there. The kanguroo has only one young at a time, which you may see attached by the mouth to the nipple inside the mother's pouch, from the period it is the size of your thumb top, and as bare and unshapen as a new-born mouse, until it attains the size of a poodle dog, with a fine glossy coat of hair, ready to leap out and hop along after the mother. The young are attached to the nipple in somewhat the same way as the placenta of other animals is attached to the uterus, the mouth being contracted round the nipple, which swells out like a cherry inside it, nourishing the fœtus by means of absorption through this indirect channel, the mouth and nipple adhering so strongly that it requires considerable force to separate them. When the fœtus arrives at sufficient age to suck, it drops off the nipple, and may then be said to be *born*, yet still continuing inside of the pouch, and sucking milk now through the ducts of that same nipple from the external surface of which it formerly derived a very different species of nourishment. The manner in which the young reach this pouch from the ovary, and attach themselves to the nipple, is still, I believe, a mystery, as no communicative duct has yet been found; but the natives assert they are born in the usual way, and that the mother places them there. It is amazing to see the young kanguroo pop its head out of the pouch when the mother is grazing, and nibble too at the tender herbage which she is passing over. When hard hunted, the mother will stop suddenly, thrust her fore paws into her pouch, drag out the young one and throw it away, that she may hop lighter along. They are always very hard pressed, however, before they thus sacrifice the life of their offspring to save their own; and it is pitiful to see the tender sympathetic looks they will sometimes cast back at the poor little helpless creatures they have been forced to desert. From this singular mode of gestation, you may handle the *fœtus in utero*, and pull it about by the tail like a kitten, from the first moment of its appearance there, up to the very day of its birth, without causing either pain or annoyance to it or its mother. Such is the very singular manner in which nearly all our Australian quadrupeds are generated and brought forth. When the young kanguroo has attained a considerable size, it will crawl out, feed about, and creep in again to warm itself, or in case any danger approaches. The kanguroos feed early in the morning, when the dew is on the grass, which is the best time to hunt them. If there is no dog in your pack that will show the game, you must keep sight of the dogs at full gallop to secure it, or else take out a little short-legged terrier, that will run the foot, and that you can eadily keep sight of till it reaches the others, otherwise you may lose all our sport, as few of our dogs give tongue either in the chase or at the

death If there is a river or pond near, the kanguroos are sure to retreat thither when hard pressed, and in this way readily baffle the natives' dogs, by shoving under water and drowning such as may venture in beside them. From the great length of their hind legs and tail, they are enabled to stand on the firm bottom, while the dogs are obliged to swim; and in this way a fight between a large kanguroo and a pack of dogs affords a most amusing spectacle. The kanguroo stands gravely upright, with his fore paws spread out before him, wheeling round and round to ward off his assailants; and whenever one arrives within his reach, he pounces his paws upon him, and sousing him suddenly under, holds him fast in this position, gazing all the while around with the most solemn, simpleton sort of aspect, heedless of the kicking and sprawling of his victim, whom he quickly puts an end to, if some courageous colleague does not in good time advance to its aid, and force the kanguroo to let his half drowned antagonist bob above water again; the dog paddles forthwith towards shore, shaking his ears and looking most piteously, with no inclination to venture in a second time, notwithstanding all the halloos and cheerings with which you urge him."

The kanguroo may be domesticated. "One of the largest tame kanguroos I have seen in this country," says Mr Cunningham, "is domesticated, and a mischievous wag he is, creeping and snuffing cautiously towards a stranger, with such an innocently expressive countenance, that roguery could never be surmised to exist under it; when, having obtained, as he thinks, a sufficient introduction, he claps his fore paws on your shoulders, as if to caress you, and, raising himself suddenly upon his tail, administers such a well put push with his hind legs, that it is two to one but he drives you heels over head! This is all done in what he considers facetious play, with a view of giving you a hint to examine your pockets, and see what *bon bons* you have got for him, as he munches cakes and comfits with epicurean *goût;* and if the door is a-jar, he will gravely take his station behind your chair at meal time, like a lackey, giving you an admonitory kick every now and then, if you fail to help him as well as yourself."

THE WOMBACH.[1]

This animal is a native of New South Wales, and was discovered in the year 1798. It is about the size of a badger, a species of which it was supposed to be, from its dexterity in burrowing in the earth by means of its fore paws; but, in its general motions, it appeared to have much of the habits and manners of a bear. It has a large head, a broad forehead, a

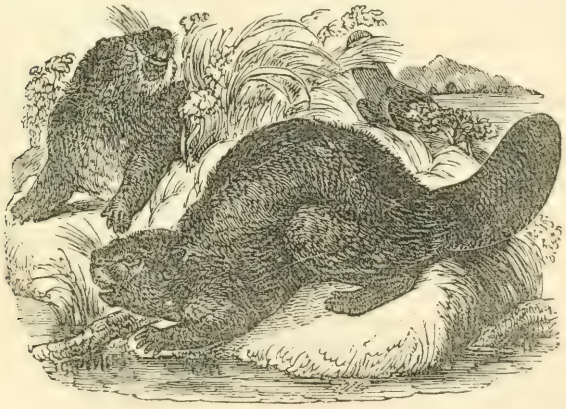
[1] *Phascolomys wombat.* This animal is the only one of the genus. It has two upper and two lower incisors; no canines; ten upper and ten lower molars. Incisors strong and thick; molars with oval crown divided by a furrow; body thick; head large, flat; ears short; eyes much separated; feet with five toes, the anterior armed with crooked and robust nails for digging; thumb of hind feet very small, nailless; tail scarcely apparent; an abdominal pouch in the female.

face tapering to the nose, which is a hard gristly substance, well adapted for removing the earth when it burrows; each jaw has two cutting teeth, long and sharp like those of a kanguroo, with a space of an inch between them and the grinders, which are strong and well set. From the structure of its teeth, it does not appear to be a carnivorous animal; its eyes are small and black; its ears short and pointed. The paws are something like a beaver's, with which it runs so awkwardly that a man could easily overtake it. Its posteriors differ from most other animals by falling down in a sloping direction, commencing at the hip joint, and descending to the knee joint of the hind legs; its tail is so short that it is scarcely perceivable. The general color is a cream brown, intermixed with black hairs. The female, like most other animals of New South Wales, is distinguished by a pouch or false belly for its young. The flesh is considered by the natives as a great luxury.

ORDER SIX—GLIRES.

Animals of this order have two large incisors in each jaw, separated from the molars by a vacant space; no canine teeth; molars with flat crowns, or blunt tubercles; extremities, the posterior longest, terminated by unguiculated toes, the number varying according to the species; mammæ variable in number; stomach simple; intestines very long.

THE BEAVER.[1]



The beaver seems to be now the only remaining monument of that kind of intelligence in brutes, which, though infinitely inferior, as to its princi-

[1] *Castor fiber*, Lin. The genus *Castor* has two upper and two lower incisors; eight upper and eight lower molars. Molars composed of a flat crown, with sinuous and complicated ridges of enamel; five toes on each foot, the anterior short and close, the posterior longer and palmated; tail broad, thick, flattened horizontally, of an oval form, naked and covered with scales.

ple, to that of man, supposes, however, certain common projects, certain relative ends in view, projects which, having for their basis society, in like manner suppose some particular method of understanding one another, and of acting in concert.

It is allowed, that the beaver, far from having an absolute superiority over the other animals, seems, on the contrary, to be inferior to some of them as to its qualities merely as an individual. It is an animal tolerably mild, tranquil, and familiar, though rather, it would seem, gloomy and melancholy. If we consider this animal, therefore, in its dispersed and solitary state, we shall find, that, as to internal qualities, it is not superior to other animals; that it has not more ingenuity than the dog, more sense than the elephant, or more cunning than the fox. It is rather remarkable for the singularities of its internal qualities. Of quadrupeds, the beaver alone has a flat, oval tail, covered with scales, which serves as a rudder to direct its motions in the water. It is the only quadruped that has membranes between the toes on the hind feet, and at the same time none on the fore ones, which it uses as hands in carrying food to the mouth. It is the only one which, while it resembles a terrestrial animal in its fore parts, seems to approach the nature of an aquatic being in its hind ones.

The beavers begin to assemble in the month of June or July, in order to form a society, which is to continue for the greater part of the year. They arrive in numbers from every side, and presently form a company of two or three hundred. The place of meeting is commonly the place where they fix their abode; and this is always by the side of some lake or river.

Godman's account, chiefly taken from Hearne, of the manner in which the beavers construct their dwellings, being somewhat particular, we insert it here.

"They are not particular in the site they select for the establishment of their dwellings, but if in a lake or pond, where a dam is not required, they are careful to build where the water is sufficiently deep. In standing waters, however, they have not the advantage afforded by a current for the transportation of their supplies of wood; which, when they build on a running stream, is always cut higher up than the place of their residence, and floated down.

"The materials used for the construction of their dams, are the trunks and branches of small birch, mulberry, willow, poplar, &c. They begin to cut down their timber for building, early in the summer, but their edifices are not commenced until about the middle or latter part of August, and are not completed until the beginning of the cold season. The strength of their teeth, and their perseverance in this work, may be fairly estimated, by the size of the trees they cut down. These are cut in such a manner as to fall into the water; and then floated towards the site of the dam or dwellings. Small shrubs, &c., cut at a distance from the water, they drag with their teeth to the stream, and then launch and tow them to the place of deposit.

At a short distance above a beaver dam, the number of trees which have been cut down, appears truly surprising, and the regularity of the stumps which are left, might lead persons unacquainted with the habits of the animal to believe that the clearing was the result of human industry.

"The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swiftly flowing, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees, they intermingle mud and stones, to give greater security; and when dams have been long undisturbed and frequently repaired, they acquire great solidity, and their power of resisting the pressure of water and ice, is greatly increased by the willow, birch, &c., occasionally taking root, and eventually growing up into something of a regular hedge. The materials used in constructing the dams, are secured solely by the resting of the branches, &c., against the bottom, and the subsequent accumulation of mud and stones, by the force of the stream, or by the industry of the beavers.

"The dwellings of the beaver are formed of the same materials as their dams, and are very rude, though strong, and adapted in size to the number of their inhabitants. These are seldom more than four old, and six or eight young ones. Double that number have been occasionally found in one of the lodges, though this is by no means a very common occurrence.

"When building their houses, they place most of the wood cross-wise, and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches, which project inward, are cut off with their teeth and thrown among the rest. The houses are by no means built of sticks first, and then plastered, but all the materials, sticks, mud, and stones, if the latter can be procured, are mixed up together, and this composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond, near the door of the hut. Mud and stones, the beaver always carries, by holding them between his fore paws and throat.

"Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used by them in building, it is an accidental circumstance, owing to the nature of the spot whence the latter was taken. As soon as any part of the material is placed where it is intended to remain, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them, upon the surface of the water, when they are in the act of diving.

"The outside of the hut is covered, or plastered with mud, late in the autumn, and after frost has begun to appear. By freezing, it soon becomes almost as hard as stone, effectually excluding their great enemy, the wolverene, during the winter. Their habit of walking over the work frequently during its progress, has led to the absurd idea of their using the tail as a

trowel. The habit of flapping with the tail, is retained by them in a state of captivity, and, unless it be in the acts already mentioned, appears designed to effect no particular purpose. The houses, when they have stood for some time, and been kept in repair, become so firm from the consolidation of all the materials, as to require great exertion, and the use of the ice chisel or other iron instruments, to be broken open. The laborious nature of such an undertaking may easily be conceived, when it is known that the tops of the houses are generally from four to six feet thick at the apex of the cone."

It is near their habitations, that they establish their magazines of fresh bark and soft wood; and to each hut or cabin, there is one allotted, of a size proportioned to the number of its inhabitants, to which they have all a common right; nor do they offer to plunder their neighbors.

Hamlets, so to express them, have been seen, composed of twenty, and even twenty-five dwellings. Such large settlements, however, are rare. In general, they do not contain more than ten or a dozen families, each of which has its own separate district, magazine, and habitation; nor will it allow any strangers to settle within its inclosure. The smallest dwellings contain two, four, and six; the largest, eighteen, twenty, and it is even said, thirty beavers; and it seldom or never happens that the number of males and females is not upon a par. Moderately speaking, therefore, their society may be said to consist frequently of one hundred and fifty, or two hundred workmen; who, having first exerted their united industry and diligence in rearing a grand public work, afterwards form themselves into different bodies, in order to construct private habitations.

However numerous the republic of beavers may be, peace and good order are uniformly maintained in it. A common series of toil has strengthened their union; the conveniences which they have procured for each other, and the abundance of provisions which, after having amassed, they continue to consume together, render them happy within themselves; and, having moderate appetites, entertaining even an aversion to blood and carnage, they have not the smallest propensity to hostility or rapine, but actually enjoy all the blessings which man is only born to desire. Friends to each other, if threatened by any enemies from abroad, they know how to avoid them; and for this purpose, on the first alarm, they give notice of their mutual danger, by striking the water with their tails, which sends forth a sound that is heard in their most distant dwellings. On this occasion, each beaver, as he thinks most expedient, plunges into the water, or conceals himself within the walls of his own habitation, which is in no danger but from the fire of the angry heavens, or from the weapons of man, and which no animal dares attempt to open or to overturn.

These asylums are not only secure, but also very neat and commodious. The floor is covered with verdure, young and tender branches of trees serving them for a carpet, on which they never permit any of their excrements to be left. The window which fronts the water, serves them for a balcony,

from which they enjoy the fresh air, and bathe themselves the greater part of the day. In the water they remain in an upright posture, the head and fore parts only being visible. This element is, indeed, so necessary to them, or rather gives them so much pleasure, that they seem unable, as it were, to live without frequent immersions in it. Sometimes they go to a considerable distance under the ice; and then they are easily taken, by attacking the dwelling on one hand, and laying in wait for them, at the same time, at a hole which is purposely formed a little way off in the ice, and to which they are obliged to come for breath.

The habit which this animal has, of continually keeping the tail and all the hind parts of the body in the water, seems to have changed the nature of its flesh. That of the fore parts, till we come to the reins, is of the same quality taste, and consistency, as the flesh of land animals; that of the tail, and of the hind legs and thighs, has the smell, the savor, and all the qualities of fish. As for the tail, in particular, it is even an extremity, and actual portion of a fish fixed to the body of a quadruped. In length, it generally measures a foot, in thickness an inch, and in breadth five or six inches. It is entirely covered over with scales, and has a skin altogether the same as that of a large fish. The largest beavers weigh from fifty to sixty pounds, and in length are little more than three feet from the tip of the snout to the insertion of the tail. The females are said to go four months with young. They bring forth about the close of winter, and their number generally consists of two or three at a time. Nearly at this period the males leave them, and go forth into the fields, where they enjoy all the sweets of the spring. In this season, they pay occasional visits to their habitation, but never reside in it. There, however, the females remain employed in suckling, tending, and rearing their little ones, who are in a condition to follow them at the expiration of a few weeks. They then, in their turn, go abroad, where they feed on fish, or on the bark of young trees, and pass the whole of their time upon the water, or among the woods.

Winter is the season which is principally allotted for hunting them, as it is then only that their fur is in perfection; and when, after their fabrics are demolished, a great number happen to be taken, their society is never restored; the few that have escaped captivity or death disperse themselves, and become houseless wanderers; or, concealed in some hole under ground, and reduced to the condition of other animals, they lead a timid life, no longer employ themselves but to satisfy their immediate and most urgent wants, no longer retain those faculties and qualities which they eminently possess in a state of society.

To capture beavers residing on a small river or creek, the Indians of America find it necessary to stake the stream across, to prevent the animals from escaping, and then they try to ascertain where the vaults or washes in the banks are situated. This can only be done by those who are very experienced in such explorations, and is thus performed:—The hunter is

furnished with an ice chisel lashed to a handle four or five feet in length, with this instrument he strikes against the ice as he goes along the edge of the banks. The sound produced by the blow informs him when he is opposite to one of these vaults. When one is discovered, a hole is cut through the ice of sufficient size to admit a full grown beaver, and the search is continued until as many of the places of retreat are discovered as possible. During the time the most expert hunters are thus occupied, the others with the women are busy in breaking into the beaver houses, which, as may be supposed from what has been already stated, is a task of some difficulty. The beavers, alarmed at the invasion of their dwelling, take to the water and swim with surprising swiftness to their retreats in the banks; but their entrance is betrayed to the hunters watching the holes in the ice, by the motion and discoloration of the water. The entrance is instantly closed with stakes of wood, and the beaver, instead of finding shelter in his cave, is made prisoner and destroyed. The hunter then pulls the animal out, if within reach, by the introduction of his hand and arm, or by a hook designed for this use, fastened to a long handle. Beaver houses found in lakes, or other standing waters, offer an easier prey to the hunters, as there is no occasion for staking the water across.

The Indians inhabiting the countries watered by the tributaries of the Missouri and Mississippi, take the beavers principally by trapping, and are generally supplied with steel traps by the traders, who do not sell, but lend or hire them, in order to keep the Indians dependent upon themselves, and also to lay claim to the furs which they may procure. The name of the trader being stamped on the trap, it is equal to a certificate of enlistment, and indicates, when an Indian carries his furs to another trading establishment, that the individual wishes to avoid the payment of his debts. The business of trapping requires great experience and caution, as the senses of the beaver are very keen, and enable him to detect the recent presence of the hunter by the slightest traces. It is necessary that the hands should be washed clean before the trap is handled and baited, and that every precaution should be employed to elude the vigilance of the animal.

The bait which is used to entice the beavers is prepared from the substance called castor (*cástoreum*,) obtained from the glandulous pouches of the male animal, which contain sometimes from two to three ounces. This substance is called by the hunters *bark*-stone, and is squeezed gently into an open mouthed phial.

We meet with beavers in America from the thirtieth degree of north latitude to the sixtieth, and even beyond it.* In the northern parts they are very common; and the farther south we proceed, their number is still found

* Pennant fixes the southern range of the American beaver in latitude 30°, in Louisiana, not far from the Gulf of Mexico; whilst Say mentions the confluence of the Ohio and Mississippi as their limit, which is about seven degrees further to the northward. Their most northern range is, perhaps, on the banks of the river Mackenzie.—*Richardson.*

to decrease. The same observation holds with respect to the Old Continent: we never find them numerous but in the more northern countries; and in France, Spain, Italy, Greece, and Egypt, they are exceedingly rare. They formerly inhabited both England and Wales, but have long been extinct in both. Giraldus Cambrensis states them to have frequented the river Tievi, in Cardiganshire. They must, however, have been uncommon, as, in the tenth century, the Welsh laws valued a beaver skin at the enormous sum of a hundred and twenty pence. The ancients knew them; and by the religion of the Magi it was forbidden to kill them.

Several authors have said, that the beaver, being an aquatic animal, could not live solely on land. This opinion, however, is erroneous; for the beaver which was mentioned in a preceding paragraph, having been taken when quite young in Canada, and always reared in the house, did not know the water when he was brought to it, was afraid of it, and refused to go into it. Even when first plunged into a basin, there was a necessity for keeping him in it by force. A few minutes after, nevertheless, he became so well reconciled to it, that he no longer showed an aversion to his new situation; and, when afterwards left to his liberty, he frequently returned to it of himself, and would even roll about in the dirt, and upon the wet pavement. One day he made his escape, and descended by a cellar staircase into the quarries under the Royal Garden. There he swam to a considerable distance on the stagnated waters which are at the bottom of those quarries; yet no sooner did he see the light of the torches which were ordered down for the purpose of finding him, than he returned, and allowed himself to be taken without making the smallest resistance.

He is an animal familiar without being fawning; and when he sees people at table, he is sure to ask for something to eat. This he does by a little plaintive cry, and by a few gestures of his fore paws. When he has obtained a morsel, he carries it away, and conceals himself, in order to eat it at his ease. In several instances he has been completely domesticated, and become as docile as a dog. When he sleeps, which he does very often, he lies upon his belly. No food comes amiss to him, meat excepted; and this he constantly refuses, either raw or boiled. He gnaws every thing he comes near; and it was found necessary to line with tin the tun in which he was brought over.

Independently of the fur, which is indeed the most valuable article furnished by the beaver, this animal furnishes a substance that has been considerably used in medicine. This substance is known by the name of *castor*. The savages, it is said, obtain an oil from the tail of the beaver, which they employ as a topical remedy for different complaints. The flesh of this animal, though fat and delicate, is yet bitter, and disagreeable to the palate.

There are two kinds of hair on the skin of the beaver; that next the skin is short, and as fine as down; the upper coat is more scanty, thicker, and

longer. The downy hair is manufactured into hats, stockings, caps, and other articles. The skin is so considerable an article of traffic, that the species which produces it will, perhaps, at length be exterminated. At one sale, the Hudson's Bay company sold about fifty-four thousand; and, in 1798, a hundred and six thousand were exported to Europe and China from Canada alone. In the year 1743, the imports of beaver skins into London and Rochelle, amounted to upwards of one hundred and fifty thousand; and there is reason to suppose that a considerable additional quantity was at that period introduced illicitly into Great Britain. In 1827, the importation of beaver skins into London for more than four times the extent of fur country than that which was occupied in 1743, did not much exceed fifty thousand.

The senses of the beaver are very acute; and so delicate is its smell, that it will suffer no filth, no bad stench, to remain near it. When kept too long in confinement, and under the necessity of voiding its excrement, it drops it near the threshold of its prison, and when the door is opened, is sure to push it out.

THE ONDATRA, MUSQUASH, OR MUSKRAT.[1]

This animal is closely allied in form and habits to the beaver, and is found in the same parts of America as that animal, from thirty to sixty-nine or seventy degrees of latitude. But it is more familiar in its habits, as it is to be found only a short distance from large towns. The musquash is a watchful, but not a very shy animal. It may be frequently seen sitting on the shores of small muddy islands, not easily to be distinguished from a piece of earth, till, on the approach of danger, it suddenly plunges into the water. It forms burrows on the banks of streams and ponds, the entrance to which is in deep water. These burrows extend to great distances, and do extensive injury to farms, by letting in the water upon the land.

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[1] *Fiber zibethicus*, Desm. The genus *Fiber* has two upper and two lower incisors; six upper and six lower molars. Molars with a flat crown and scaly angular zigzag plates of enamel; fore feet with four toes and the rudiment of a thumb; posterior with five, edged with stiff and close bristles; tail long, compressed laterally, naked except a few scattered hairs, and granular.

In some situations, these animals build houses of a conical form, resembling those of the beaver, formed of mud, grass, and reeds plastered together. They feed upon the roots and tender shoots of aquatic plants, and on the leaves of grasses. They are excellent swimmers, dive well, and can remain for a long time under water. It is rare to have an opportunity of seeing the animal during the day, as it then lies concealed in its burrow, and it is not till night, that it issues forth for food or recreation. It does not, like the beaver, lay up a store of provision for the winter; and it builds a new habitation every season.

This animal is common in the Atlantic States, and its fur being valuable for hats, it is much hunted. The Indians kill them by spearing them through the walls of their houses. Between four and five thousand skins are annually imported into Great Britain from North America.

The ondatra is of the size of a small rabbit, and of the form of a rat. Its head is short and similar to that of the water rat; its hair is soft and glossy, with a very thick down underneath, nearly like that of the beaver; its tail is long, and though of a different form, being flattened laterally, it is covered nevertheless with little scales, in the same manner as those of other rats.

THE WATER RAT[1]

Is a little animal, about the size of the black rat, but in its nature and habits rather resembling the otter than the rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds; like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the water rat is shorter, the nose broader, the hair more erect, and the tail much longer, than that of the land rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in

[1] *Arvicola amphibius*, Lin. The genus *Arvicola* has two upper and two lower incisors; six upper and six lower molars. Molars with a flat crown and angular plates of enamel ears large; anterior toes with nails; tail round, hairy, almost the length of the bod-

Catholic countries, the peasants eat it during Lent, as they do that of the otter. This species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dikes.

THE FIELD MOUSE[1]

Is smaller than the rat, but larger than the common mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different intermediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c., that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace, through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

The short tailed field mouse, is more generally diffused than the long tailed kind, and is found almost every where; in woods, in meadows, and even in gardens.

[1] *Arvicola vulgaris*, Desm.

THE LEMMING RAT,[1] OR LAPLAND MARMOT,

Is of the shape of a mouse, but has a shorter tail; its body is about the length of five inches, covered with fine hair of various colors. Those of Norway are of the size of a water rat; but those of Lapland are scarcely as large as mice. The former are variegated with black and tawny in the upper parts; the sides of the head and the under parts are white. The legs are grayish, and the under parts of the body of a dull white. In some, there are many red hairs about the mouth, resembling whiskers, six of which are longer and redder than the rest. The mouth is but small, and the upper lip is divided like the squirrel's. The remains of the food in the throat of this animal, incline us to imagine it ruminates. The head is large, short, and thick; the neck short, and the body thick. The eyes are small and black; the ears round, and inclining towards the neck; the legs before are short, and those behind longer, which gives it a greater degree of swiftness; the feet are clothed with hair, and armed with five very sharp and crooked claws; the middle claw is very long, and the fifth is like a little finger, or the spur of a cock, sometimes placed very high up the leg. This animal, therefore, whose legs are very short, runs very swift. It generally inhabits the mountains of Norway and Lapland, but descends in such great numbers in some years, and in some seasons, that the inhabitants look on their arrival as a terrible scourge, from which there is no possibility of deliverance. They move, for the most part, in a square, marching forward by night, and lying still by day. Thus, like an animated torrent, they are often seen more than a mile broad covering the ground, and that so thick, that the hindermost touches its leader. It is in vain that the inhabitants resist, or attempt to stop their progress; they still keep moving forward; and though thousands are destroyed, myriads are seen to succeed and make their destruction impracticable. They generally move in lines, which are about three feet from each other, and exactly parallel. Their march is always directed from the north-west to the south-west, and regularly conducted from the beginning. Wherever their motions are turned, nothing can stop them; they go directly forward, impelled by some strange power; and from the time they at first set out, they never think of retreating. If a lake or a river happens to interrupt their progress, they all together take the water and swim over it; a fire, a deep well, or a torrent, does not turn them out of their straight lined direction; they boldly plunge into the flames, or leap down the well, and are sometimes seen climbing up on the other side. If they are interrupted by a boat across the river while they are swimming, they never attempt to swim round it, but mount directly up its

[1] *Lemmus Norvegicus*, Desm. The genus *Lemmus* has two upper and two lower incisors; six upper and six lower molars. Molars with a flat crown and angular plates of enamel; ears very short; fore feet in some species with five, in others four toes, proper for digging; tail short and hairy.

sides; and the boatmen, who know how vain resistance would be, calmly suffer the living torrent to pass over, which it does without farther damage. If they meet with a stack of hay or corn which interrupts their passage, instead of going over it, they gnaw their way through; if they are stopped by a house in their course, if they cannot get through it, they continue there till they die. It is happy, however, that they eat nothing that is prepared for human subsistence; they never enter a house to destroy the provisions, but are contented with eating every root and vegetable that they meet. If they happen to pass through a meadow, they destroy it in a very short time, and give it an appearance of being burnt up and strewed with ashes. If they are interrupted in their course, and a man should imprudently venture to attack one of them, the little animal is no way intimidated by the disparity of strength, but furiously flies up at its opponent, and barking somewhat like a puppy, wherever it fastens it does not easily quit its hold; if, at last, the leader be found out of its line, which it defends as long as it can, and be separated from the rest of its kind, it sets up a plaintive cry, different from that of anger, and, as some say, gives itself a voluntary death, by hanging itself on the fork of a tree.

An enemy so numerous and destructive would quickly render the countries where they appear, utterly uninhabitable, did it not fortunately happen that the same rapacity that animates them to destroy the labors of mankind, at last impels them to destroy each other. After committing incredible devastation, they are at last seen to separate into two armies, opposed with deadly hatred, along the coasts of the larger lakes and rivers. The Laplanders, who observe them thus drawn up to fight, instead of considering their mutual animosity as a happy riddance of a most dreadful pest, form ominous prognostics from the manner of their engagements. They consider their combats as a presage of war, and expect an invasion from the Russians or Swedes, as the side next those kingdoms happens to conquer. The two divisions, however, continue their engagements and animosity, until one party overcomes the other: from that time they utterly disappear, nor is it well known what becomes of either the conquerors or the conquered. Some suppose, that they rush headlong into the sea; others, that they kill themselves, as some are found hanging on the forked branches of trees; and others, that they are destroyed by the young spring herbage. But the most probable opinion is, that having devoured the vegetable productions of the country, and having nothing more to subsist on, they then fall to devouring each other, and having habituated themselves to that kind of food, continue it. However this be, they are often found dead by thousands, and their carcasses have been known to infect the air for several miles round, so as to produce very malignant disorders. They also seem to infect the plants they have gnawed, for the cattle often die that afterwards feed in the places where they have passed. The inhabitants have an opinion, as they do not know whence such numbers proceed, that they fall with the rain.

Five or six young ones are produced at each litter, and the female brings forth several times in the course of a year. They sometimes litter while emigrating, and they have been seen carrying some of their offspring in their mouths, and others on their backs.

As for the rest, the male is generally larger and more beautifully spotted than the female; they go in droves into the water; but no sooner does a storm of wind arise, than they are all drowned. The flesh of the lemmings is horrid food, and their skin, although covered with a very beautiful fur, is of too little consistence to be serviceable.

HUDSON'S BAY LEMMING.[1]

This curious animal was first described by Foster, and afterwards more fully by Pallas. It inhabits Labrador, Hudson's Straits, and the coast from Churchill to the extremity of Melville peninsula, as well as the islands of the Polar sea, visited by Captain Parry. Its habits are still imperfectly known. In summer, according to Hearne, it burrows under stones, in dry ridges; and Captain Sabine informs us, that in winter it resides in a nest of moss, on the surface of the ground, rarely going abroad. The former author also acquaints us that it is so easily tamed, that if taken even when full grown, it will in a day or two be perfectly reconciled, very fond of being handled, and will creep, of its own accord, into its master's neck or bosom. There are three other different species of the lemming, belonging to America.

THE FAT SQUIRREL, OR DORMOUSE.[2]

Of this kind of animal, we know three species, which, like the marmot, sleep during the winter; namely, the fat squirrel, the garden squirrel, and the common dormouse. Many authors have confounded these species together, though they are all three very different, and of consequence easily known and distinguished.

The fat squirrel is nearly of the size of the common European squirrel; and, like it, its tail is covered with long hair. It is of a pale ash color on the upper parts of the body, and whitish on the under. It is without propriety, that the term *sleep* has been applied to the state of these animals

[1] *Lemmus Hudsonius*, Desm.

[2] *Myoxus glis*, Lin. The genus *Myoxus* has two upper and two lower incisors; eight upper and eight lower molars. Molars simple, with transverse projecting lines; fore feet with four toes, and the rudiment of a thumb; tail very long, round, with hair tufted or depressed.

during the winter. They are not in a state of natural sleep at this period; they are in a torpor, which is produced by the coldness of the blood, and by which they lose the use of their members and senses. Their internal heat is indeed so small, that it hardly exceeds that of the temperature of the air. When the heat of the air is at ten degrees above the freezing point of the thermometer, the heat of these animals is also at ten degrees. Now it is well known, that the internal heat of man, and of the generality of animals, exceeds at all times thirty degrees; and therefore there is little reason to wonder why these animals, so inferior to all others in point of heat, should become torpid as soon as their little quantity of internal heat ceases to be assisted by the external heat of the air; a circumstance which naturally happens when the thermometer is not more than ten or eleven degrees above congelation. This is the real cause of the torpor of these animals; a cause of which naturalists have not been apprised, and which, nevertheless, extends to all animals that sleep during the winter.

This torpor continues as long as the cause which produces it continues, and ceases when the cold ceases. A few degrees of heat above the tenth or eleventh degree are sufficient to reanimate these creatures; and if they are kept in a very warm place during winter, they do not become torpid at all.

The flesh of the fat squirrel is not unlike that of the guinea-pig. They were considered as a dainty, by the Romans, who fattened great numbers of them in receptacles, called *gliraria*. Like the common squirrel, this animal lives in forests, climbs to the tops of trees, and leaps from branch to branch. This it does less nimbly, indeed, than the squirrel, whose legs are longer, whose belly is by no means so big, and which is remarkable for being meagre. Nuts, however, and other wild fruits, form its usual nourishment. It likewise eats little birds, which it takes in the nests. It does not, like the squirrel, nestle in the upper parts of trees, but makes a bed of moss in the trunks of those which are hollow. It also shelters itself in the clefts of rocks, and always manifests a preference for dry places. It avoids moisture, it drinks little, rarely descends to the ground, and, unlike the squirrel, which is easily tamed, remains always wild. The species is very generally diffused in Europe.

THE GARDEN DORMOUSE[1]

Is of a tawny color on the upper part of the body, and whitish ash, tinged with yellow, on the under. Round each eye it has a black circle, and a black spot behind each ear.

These animals nestle in the holes of walls, climb up trees, choose the best fruits, and gnaw them as they begin to ripen. To peaches, in particular, they are exceedingly destructive. They climb up pear, apricot, and

[1] *Myoxus nitela.* Desm.

other trees; and in a scarcity of other fruit, they eat almonds, nuts, and even leguminous plants. These they carry in great quantities to their holes, where they make a bed of herbs, moss, and leaves. The cold stupifies, the heat revives them; and sometimes there are eight or ten found in one place, all in a state of torpor, all huddled together, and rolled up in a ball, in the midst of their hoard of provisions. Their flesh is not eatable, and has even the disagreeable smell of the house rat. This animal s to be found in all the temperate climates of Europe.

THE COMMON DORMOUSE.[1]

This animal has eyes sparkling, full, and black; its tail is tufted, and its hair of a tawny red. The throat is white. It never lives in houses, is seldom to be found in gardens, but chiefly frequents the woods, where it finds a shelter in the hollow of some old tree.

The species is by no means numerous, yet they seem to be tolerably common in Italy, and to be not unknown even in the northern climates; but it does not appear to be an English animal; for Ray, who had seen it in Italy, observes, that the small dormouse which is found in England, is not red upon the back, like the Italian, and that it probably belongs to another species.

The dormouse becomes torpid by the cold, and rolls itself up in a ball; it revives in mild weather, and hoards up nuts and other dry fruits, for future sustenance. It forms its nest in trees, like the squirrel, though generally in a lower situation, among the branches of a nut tree, in a bush, &c. The nest is composed of interwoven moss, leaves, and grass; is about six inches in diameter; has no aperture but at the top, and contains three or four young ones.

THE NORWAY RAT.[2]

This well known animal came originally from Persia or India, and was not known in England, previous to 1730. It is now naturalized in all the countries of Europe and America.

[1] *Myoxus avellanarius*, Desm.

[2] *Mus decumanus*, Desm. The genus *Mus* has two upper and two lower incisors; canines, none; molars, three above and three below, on each side. Molars with tuberculous crowns; four toes, and rudimentary thumb on the fore feet; hind feet with four unguiculated toes; ears oblong or round, naked; tail long, naked, and scaly; fur with scattered hairs, longer and stiffer than the others, sometimes forming a kind of spines.

It has a reddish skin, a long tail, the backbone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century, since that species has been spread in the neighborhood of Paris. They multiply, indeed, prodigiously; since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavors to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce, at least, three dozen in the space of twelve months.

THE BLACK RAT[1]

Is carnivorous, and even, if the expression is allowable, *omnivorous*. Hard substances, however, it prefers to soft ones; it devours wool, stuffs, and furniture of all sorts; eats through wood, makes hiding-places in walls, thence issues in search of prey, and frequently returns with as much as it is able to drag along with it, forming, especially when it has young ones to provide for, a magazine of the whole. The females bring forth several times in the year, though mostly in the summer season; and they usually produce five or six at a birth.

In defiance of the cats, and notwithstanding the poison, the traps, and every other method that is used to destroy these creatures, they multiply so fast as frequently to do considerable damage. On board a man of war they have been known to consume a hundred weight of biscuits daily, and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned, on account of their immense swarms; and, even now, they are a severe scourge to it. In old houses, in the country, especially, where great quantities of corn are kept, and where the neighboring barns and hay-stacks favor their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case, when they have been in any degree straitened for provisions; and the method they take to lessen their num-

[1] *Mus rattus*, Lin.

bers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havoc till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the rat should fall a victim.

THE MOUSE[1]

Is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its fears and its wants are the sole springs of its actions. It never leaves its hiding-place, but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. When viewed without the absurd disgust and apprehension which usually accompanies, or is affected at the sight of it, the mouse is a beautiful creature; its skin is sleek and soft, its eyes bright and lively, all its limbs are formed with exquisite delicacy, and its motions are smart and active. Though one of the most timid of creatures, the mouse may be taught to repose confidence in mankind, and will quit its place of refuge to receive food. Some few of this species are of a pure white color, with large

[1] *Mus musculus*, Lin

red eyes; but whether they be a permanent kind, or only an accidental variety, cannot well be determined.

But for its immense fecundity, the species of the mouse could not subsist. Even in mouse-traps they have been known to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves.

THE HAMSTER.[1]

This animal, which is also called the German marmot, is about the size of the brown rat, but much thicker. Its color is reddish brown above, and black beneath; there are three large oval white spots on each side of the body. The ears are somewhat large. But the peculiarity which distinguishes it is, that there are two pouches, or receptacles for food, on each side of its mouth. These are not conspicuous externally, when empty but, when distended, they resemble a pair of tumid bladders, with a smooth, veiny surface, which the fur of the cheeks conceals. The pouches of one which Dr Russel dissected, were found stuffed with French beans, arranged lengthways, in such compact and accurate order, that it was exceedingly difficult to conceive how they had been so placed. When loosely laid on a table, they formed a heap thrice the bulk of the animal's body. Austria, Silesia, and some parts of Germany, are their native places.

The hamster is one of the most famous and most pernicious rats that exists. "We have fed one of these animals for many months," says Buffon, "and afterwards had it dissected, and observed, that the hamster resembled more the water rat, than any other animal; it resembled it, also, in the smallness of its eyes, and the fineness of its hair; but its tail is not so long as that of a water rat; but, on the contrary, it is much shorter than that of the short tailed mouse. All these animals live under the earth, and seem to be animated with the same instinct. They have nearly the same habits, and particularly that of collecting corn, &c., and making great magazines in their holes."

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[1] *Cricetus vulgaris*, Desm. The genus *Cricetus* has two upper and two lower incisors; no canines; six upper and six lower molars. Crown of the molars with blunt tubercles; fore feet with four toes, and a rudimentary thumb; hind feet pentadactyle, with strong nails; tail short and hairy; cheek pouches.

The habitations of the hamsters are different, according to their sex and age, and also to the quality of the land they inhabit. That of the male hamster, is an oblique passage, and at the entrance is a portion of earth thrown up. At a distance from the entrance, there is a single hole, which descends in a perpendicular manner to the chambers or cavities of the habitation. There is no hillock of earth near that hole; which makes us presume, that the oblique entrance is made hollow from the outside, and that the perpendicular hole, by which they come out, is worked withinside, from the bottom to the top.

The habitation of the female has also an oblique passage, with two or three, and even eight perpendicular holes, by which the young ones may come in and go out. The male and the female have each their separate abode; that of the female is deeper than that of the male.

The perpendicular hole is the common passage for coming in and going out. By the oblique road, they throw out the earth they scratch up. This passage also has a gentle declivity into some of the cavities, and another more steep into others, which serve for a free circulation of the air in this subterraneous habitation. The cavity where the female breeds her young contains no provision, but only a nest formed of straw or grass. The depth of the cavity is very different. The young hamster, of a year old, makes its burrow only a foot deep, while the old animal often hollows it to the depth of four or five feet. All the cavities communicate together in one habitation, which is about eight or ten feet in diameter.

These animals store their magazines with dry clover, corn, and other grain; beans and peas they likewise provide themselves with; all these they are particularly careful to separate from the husk, which, with every other matter they do not make use of, they carry out of their habitation by this oblique passage.

The hamster commonly gets in its winter provisions at the latter end of August. Its stores are not meant for a winter supply, it being torpid at that season, but for the preceding and following period. When it has filled its magazines, it covers them over, and shuts the avenues to them carefully with earth. This precaution renders the discovery of these animals very difficult. The heaps of earth which they throw up before the oblique passage, are the only marks to trace their habitations. The most usual method of taking them, is by digging them out of their holes, which is attended with much trouble, on account of the depth and extent of their burrows; however, a man versed in this business, commonly effects his purpose with good success. In autumn, he seldom fails of finding two good bushels of corn in each of their habitations; and he draws great profit from the skins of the animals. The hamsters bring forth their young two or three times in a year, and seldom less than five or six each time. Some years there are great numbers of them to be seen, and in others, scarcely any to be met with. They multiply in great numbers when the seasons are wet,

which causes a great scarcity of grain, by the devastation these animals make.

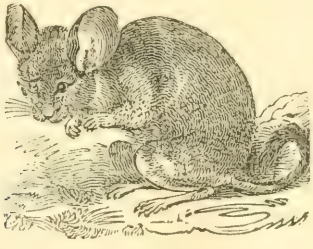
The back of the hamster is commonly brown, and the belly black; however, there are some of a gray color; and this difference may proceed from their age. Besides these, there are some often met with which are entirely black.

The hamster begins to burrow at the age of six weeks, or two months; it never procreates, however, in the first year of its growth. There are numbers produced in one year, insomuch, that, in some parts of Germany, from their occasioning a dearth of corn, a reward is fixed on their heads. In one year, about eleven thousand skins, in another fifty-four thousand, and in a third year, eighty thousand were produced at the town hall of Gotha, as vouchers to enable the bearers to receive the reward. They are likewise in such great numbers, that their fur is sold exceedingly cheap.

The polecat is a great enemy to the hamster, which he destroy in great numbers; he not only pursues them on land, but follows them into their burrows, and feeds on them there.

The hamster itself, is one of the most inveterate enemies of its own kind. His life, (says a recent naturalist,) is divided between eating and fighting. He seems to have no other passion than that of rage; which induces him to attack every animal that comes in his way, without in the least attending to the strength of the enemy. Ignorant of the art of saving himself by flight, rather than yield, he will allow himself to be beaten in pieces with a stick. If he seizes a man's hand, he must be killed before he will quit his hold.

THE CHINCHILLA.[1]



This interesting animal, which produces the fur which passes under its name, is a species of field mouse, and is common in the high plains of Chili and Peru. It is about nine inches in length, and has a tail about half the length of its body. It sits upon its haunches, and takes its food in its fore paws like a squirrel. It feeds chiefly upon bulbous roots.

[1] *Cricetus laniger*, Desm.

THE JERBOA.[1]

The head of the jerboa is sloped somewhat in the manner of a rabbit; but the eyes are larger, and the ears shorter, though elevated and open, with respect to its size; its nose and hair are of a flesh color, its mouth short and thick, the orifice of the mouth very narrow, the upper jaw very full, the lower narrow and short, the teeth like those of the rabbit; the whiskers are composed of long black and white hairs; the fore feet are very short,

and never touch the ground; they are furnished with four claws, which are only used as hands to carry the food to the animal's mouth; the hind feet have but three claws, the middle one longer than the other two. The tail is three times as long as its body, and is covered with short stubborn hair, of the same color as that on the back, but tufted at the end with longer and softer hair; the legs, nose, and eyes are bare, and of a flesh color. The upper part of the head and back are covered with an ash colored hair; the sides, throat, and belly are whitish; and below the loins, and near the tail, there is a large, black, transversal band, in form of a crescent. While leaping, the jerboa stretches out its tail, but while standing or walking, it carries it in the form of an S, the lower part touching the ground.

These little animals commonly conceal their hands, or fore feet, with their hair; so that they are said by some to have only hinder feet. When they move from one place to another, they do not walk, that is, advance one foot before the other, but jump, or bound, about four or five feet at a time; this they do with the greatest ease and swiftness, holding themselves erect, after the manner of birds, when they hop on the ground. Instead, however, of proceeding straight forward, it jumps first to one side, and then to the other. Such is its agility, that even a greyhound can scarcely kill it. They rest themselves in a kneeling posture, and only sleep in the day. In the night-time, they seek for their food like hares, and, like them, feed on grass, corn, and other grain. They are of a gentle nature, but not to be

[1] *Dipus gerboa*, Desm. The genus *Dipus* has two upper and two lower incisors; no canines; six or eight upper, and six lower molars. Molars simple, with tuberculous crowns; eyes large; ears long, pointed; posterior extremities much elongated, with the number of toes variable, but having only one metatarsal bone; tail very long, tufted

tamed beyond a certain limit. They burrow like rabbits, and in much less time. The excavations which it forms are many yards long, oblique, and winding, but not more than half a yard from the surface of the ground. It is fond of warmth, making its nest of the finest and most delicate herbage, and seems sensible of the approach of bad weather by wrapping itself up close in hay, with its head between its thighs. It sleeps during winter, without nutriment. The Jerboa breeds several times in the summer, and usually brings forth seven or eight young ones at a litter. The flesh is reckoned one of the greatest of delicacies by the Arabs. They are found in Syria, Phœnicia, Barbary, &c.

THE LABRADOR JUMPING MOUSE[1]

Is found in the fur countries as far north as Slave Lake. Its color is brown above, and white beneath.

THE MARMOT.[2]

There seems to be a combination of the bear and the rat in the form of the marmot. Its nose, its lips, and the form of its head, are like those of the hare; it has the hair and claws of the badger, and teeth of the beaver, the whiskers of the cat, the paws of the hare, with a tufted tail and short

[1] *Gerbillus Labradorius*, Sabine. The genus *Gerbillus* has two upper and two lower incisors; no canines; six upper and six lower molars. Molars tuberculous; posterior extremities very long, with five toes, each with its proper metatarsal bone; tail long, covered with hair.

[2] *Arctomys marmotta*, Desm. The genus *Arctomys* has two upper and two lower incisors; no canines; ten upper and eight lower molars. Incisors very strong; molars with ridges and blunt tubercles; body thick and heavy; head large; no cheek pouches; ears short and rounded; eyes large; feet robust, those before with four toes and a rudimentary thumb; those behind with five toes, the nails strong, compressed, and crooked.

ears. The color of its hair on the back is reddish brown. On the belly it is reddish, but softer and shorter. Its voice resembles that of a little dog when it is played with or caressed; but when it is irritated or frightened, it raises a loud and shrill cry, highly offensive to the ear. The marmot is a very cleanly animal. In autumn, particularly, it is loaded with fat, though all the parts of the body are never equally so. The marmot would be tolerable food, did it not constantly retain somewhat of a disagreeable smell.

This animal, which delights in the regions of ice and snow, and is never found but on the highest mountains, is, nevertheless, most liable to be benumbed by the cold. From the end of September, or the beginning of October, the marmot generally retires to its hole, and appears not again till about the beginning of April. The place of its retreat is formed with precaution, and finished with art. It is rather wide than long, and very deep, so that it is capable of containing several, without being under a necessity of crowding each other, or injuring the air they breathe. Their feet and claws are formed as if they were designed to dig; and, in fact, they burrow into the ground with amazing celerity, scraping up the earth, and throwing back what they have loosened behind them constantly as they proceed. Still more wonderful is the form of their hole; it resembles the letter Y, the two branches having each an opening that conducts into one channel, which terminates in their general apartment at the bottom. As the whole is contrived on the declivity of a mountain, there is no part of it on a level but the apartment at the end. One of the branches, or openings, issues out sloping downward; and this serves as a kind of sink, or drain, for the whole family, in which they void their excrements, and through which the moisture of the place finds an easy passage. The other branch, on the contrary, slopes upward, and serves them as a door to go in and out. The apartment at the end is warmly lined with moss and hay. It is even asserted, that this is a public work; that some cut the finest grass, others pile it up, and others take their turns to convey it to the hole. Upon this occasion it is added, one of them lies upon its back, permits the hay to be heaped upon its belly, keeps its paws upright to make greater room, and in this manner, remaining still upon its back, is dragged by the tail, hay and all, to their common retreat. This practice some assign as a reason for the hair being generally worn away from their backs. However, another and perhaps a better reason may be given for this appearance; namely, their inhabiting cells under ground, and being constantly employed in digging up the earth. Whenever they venture abroad, one is placed as a sentinel, sitting on an elevated rock, while the others amuse themselves in the fields below, or are employed in cutting grass, and making it into hay for their future convenience; and no sooner does their trusty sentinel perceive a man, an eagle, a dog, or any other enemy, than he gives notice to the rest by a kind of whistle, and is himself the last that takes refuge in the cell.

They make no provision for the winter, foreseeing probably that such a

precaution would be useless. But when they perceive the first approaches of the season, in which their vital motions are to continue in some measure suspended, they labor very diligently to close up the apertures of their dwellings, which they effect with such solidity, that it is more easy to open the earth any where else, than where they have closed it. They are at that time very fat, and some of them are found to weigh twenty pounds. In this plight they continue for three months longer; but by degrees their flesh begins to waste, and they are quite thin by the end of winter. When their retreat is discovered, they are found each rolled into a ball, and covered with hay. In this state they seem entirely lifeless; they may be taken away, and even killed, vithout their testifying any sense of pain; and those who find them in this manner carry home the fat ones for food, and the young ones for breeding up and taming. The marmot produces but once a year, and the litter generally consists of three or four. Their growth is quick, and they live only nine or ten years. They are found in the Alps, Apennines, Pyrenees, in the highest mountains of Germany, in Poland, and in America, with some variations.

When taken young, the marmot is more capable of being tamed than any other wild animal. It will easily learn to perform feats with a stick, to dance, and in every thing to obey the voice of its master. It has a great antipathy to the dog; and when it becomes familiar in a house, and is sure of being supported by its master, it will, in his presence, attack the largest dogs, and boldly fasten upon them with its teeth. Though this creature is not quite so large as a hare, it is yet of a more squat make, and has great strength joined to great agility. It has four teeth in the front of the jaw, which are long and strong enough to inflict a terrible wound; and yet, unless provoked to it, it neither attacks dogs, nor does mischief to any creature whatever. If care be not taken, however, it will gnaw the furniture of a house, and will even make holes through wooden partitions.

As the marmot has very short thighs, and the toes of its paws are formed like those of the bear, so it often sits erect, and walks with ease, like that animal, upon its hind feet. With its fore paws it carries its food to its mouth, and eats in an upright posture like the squirrel. It runs much swifter up hill than down; it climbs trees, and runs up the clefts of rocks or the contiguous walls of houses, with much facility; so much so, indeed, that it is ludicrously observed of the Savoyards, who are the general chimney-sweepers of Paris, that they have learned their trade from the marmot.

These animals eat indiscriminately of whatever is given them, whether it be flesh, bread, fruits, herbs, roots, pulse, or insects. Of milk and butter, however, they are particularly fond; and, though less inclined to petty thefts than the cat, they are yet never better pleased than when they obtain access to the dairy.

THE MARYLAND MARMOT, OR WOODCHUCK.[1]

This animal is common in all the temperate parts of America. It does great injury to the farmers, as the quantity of herbage it consumes is really surprising. It burrows in the ground on the sides of hills, and these extend to great distances under ground, and terminate in various chambers. Here the marmot makes himself a comfortable bed of dry leaves, grass, and any soft rubbish, where he sleeps from the close of day, till the next morning is far advanced.

The Maryland marmot eats with great greediness, and in large quantities. It is fond of cabbage, lettuce, and other garden vegetables. When in captivity, it is exceedingly fond of bread and milk.

At the commencement of cold weather, the marmot goes into winter quarters, blocks up the door within, and remains torpid till the warm season. It is about the size of a rabbit, and of a dark brown color.

PARRY'S MARMOT.[2]

This animal has a blunt snout, and short ears, with a long tail tipped with black. The body is marbled on the upper part with confluent black and white spots, and ferruginous beneath. It is one foot in length, and inhabits Canada.

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[1] *Arctomys monax*, Lin. [2] *Arctomys Parryi's*, Richardson.

THE SQUIRREL.[1]

The common squirrel of Europe is a beautiful little animal, which is only half wild, and which, by its gentleness, its docility, and even the innocence of its manners, might deserve to be exempted from the present class. It is neither properly a carnivorous nor an injurious animal, though it sometimes seizes on birds; its general food consisting of fruit, almonds, hazlenuts, beech-mast, and acorns; it is neat, cleanly, alert, lively, and industrious; its eyes are large, black, and full of fire, its countenance is sharp, its body is nervous, and its limbs are supple. It is of a bright brown color, inclining to red; the breast and belly are white; the ears are ornamented with long tufts of hair. The fore feet are strong and sharp, and the fore legs are curiously furnished with long stiff hairs, projecting on each side like whiskers.

The beauty of its form is yet heightened by a spreading tail, in shape like a plume of feathers, which it raises above its head, and forms into a kind of shade for itself.

The squirrel may be said to be less a quadruped than almost any other four-footed animal. It generally holds itself almost upright, using its fore feet as hands for a conveyance to its mouth. Instead of hiding itself in the earth, it is continually in the air; it somewhat resembles the birds by its lightness and activity; like them, it rests upon the branches of trees; leaping from one to the other, and in the highest of them builds its nest. It avoids the water still more than the earth; and it is even asserted of this animal, that, when it is obliged to cross a river or stream, it uses the bark of a tree, or some such light woody substance, as a boat, while its tail supplies the place of sails, and of a rudder. It gathers together a quantity of

[1] *Sciurus vulgaris*, Lin. The genus *Sciurus* has two upper and two lower incisors; no canines; ten upper and ten lower molars. Inferior incisors compressed laterally; molars tubercular; body elongated; head small; ears erect, rounded; eyes large; fore feet with four long toes, with compressed crooked nails and a tubercular thumb; hind feet very large, with five toes; tail long, often with hair disposed in two rows; two pectoral and six ventral mammæ.

nuts during the summer, which it deposits in the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beach tree, let its bark be ever so smooth.

THE AMERICAN GRAY SQUIRREL[1]

Is remarkable for its beauty and activity, and is common throughout the United States. It is generally found in hickory and chesnut woods, where it feeds on nuts, and lays up a hoard for the winter. They construct their nests with care on the tops of tall trees, and seldom leave them during the cold weather. They do a great deal of mischief in the corn fields, by destroying and carrying off a great quantity of corn. They are very easily domesticated, and in captivity are very playful and mischievous. The gray squirrel is commonly of a fine bluish gray, mingled with a golden color.

AMERICAN FLYING SQUIRREL.[2]

The common flying squirrel is very abundant in the United States, and is much admired for the softness of its fur, and the gentleness of its disposition. The skin of the sides is extended from the fore to the hind limbs, so as to form a sort of sail, which enables it to descend swiftly from a great height, in the easiest and most pleasant manner, often passing over a considerable space. This squirrel is small, of an ash color above, and white beneath, with large, prominent black eyes. It builds its nest in hollow trees.

[1] *Sciurus cinereus*, Desm.

[2] *Pteromys volucella*, Desm. The genus *Pteromys* has two upper and two lower incisors; no canines; ten upper and eight lower molars; head round; ears rounded; eyes large; fore feet with four elongated toes, with compressed sharp claws and the rudiment of a thumb; hind feet with five toes much divided; tail long, hairy, sometimes distichous; skin of the sides extended, forming a kind of parachute.

The Severn River flying squirrel is much larger than the species described above, has a longer tail, and is of a different color. It is found near James' Bay and Lake Huron.

The Rocky Mountain flying squirrel lives in thick pine forests, and seldom leaves its retreats except at night. It resembles the Severn River flying squirrel in form, though its limbs and tail are larger. It is of a yellowish brown color.

THE PORCUPINE[1]

Is generally about two feet in length, from the head to the extremity of the tail. The body is covered with spines, from ten to fourteen inches long,

[1] *Hystrix cristata*, Lin. The genus *Hystrix* has two upper and two lower incisors; no canines; eight upper and eight lower molars. Molars with flat crowns, but with ridges of enamel; head strong; muzzle gibbous; ears short, rounded; tongue with spiny scales; fore feet with four toes and a rudimentary thumb; hind feet pentadactyle; spines more or less long, on the body, sometimes intermixed with hairs; tail sometimes prehensile.

resembling the barrel of a goosequill in thickness, but tapering at both ends, and variegated with black and white rings. In their usual state, they incline backward, like the bristles of a hog, but when the animal is irritated, they rise and stand upright.

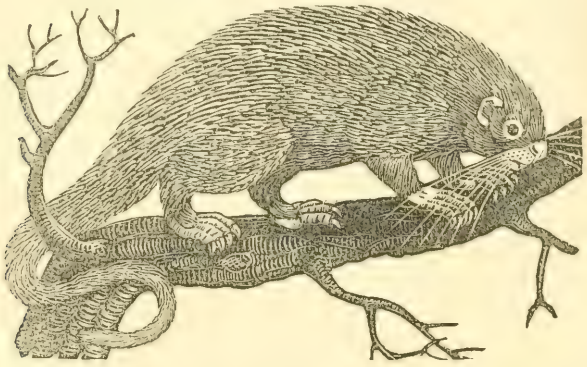
Travellers and naturalists have almost unanimously declared, that this animal has the faculty of discharging its quills, and wounding its foes at an immense distance; that these quills have the extraordinary and particular property of penetrating farther into the flesh, of their own accord, as soon as ever the point has made an entrance through the skin. These stories, however, are all purely imaginary, and without the smallest foundation or reason. The error seems to have arisen either from this animal raising its prickles upright, when he is irritated; and, as there are some of them which are only inserted into the skin by a small pellicle, they easily fall off; or from his sometimes shaking off his quills to a considerable distance when he is shedding them. We have seen many porcupines, but have never observed them dart any of their quills from them, although they were violently agitated. We cannot, then, avoid being greatly astonished, that the greatest authors, both modern and ancient, as well as the most sensible travellers, have joined in believing a circumstance so entirely false. In justice, however, to Dr Shaw, we must except him from the number of these credulous travellers: "Of all the number of porcupines," says he, "which I have seen in Africa, I have never yet met with one which darts its quills, however strongly it was irritated. Their common method of defence is to lie on one side, and when the enemy approaches very near, to rise suddenly, and wound him with the points of the other." It appears, however, that there is a pernicious quality in the quills; which renders it difficult to cure the wounds inflicted by them.

The porcupine, although a native of the hottest climates of Africa and India, lives and multiplies in colder countries, such as Persia, Spain, and Italy. Agricola says, that the species were not transported into Europe before the last century. They are found in Spain, but more commonly in Italy, especially on the Apennine mountains, and in the environs of Rome.

In its wild state, the porcupine is a perfectly inoffensive animal. It never attacks, and will elude an aggressor when it can; but if compelled to defend itself, it forces even the lion to retire. In its domestic state, it is neither furious nor vicious; it is only anxious for its liberty; and, with the assistance of its fore teeth, which are sharp and strong, like those of the beaver, it easily cuts through a wooden prison. It is also known, that it feeds willingly on fruits, chesnuts, and crumbs of bread; that, in its wild state, it lives upon roots and wild grain; that, when it can enter a garden, it makes great havoc, eating the herbs, roots, fruit, &c. It becomes fat like most other animals, towards the end of summer; and its flesh, although insipid, is tolerable eating.

When the form, substance, and organization of the prickles of the porcupine are considered, they are found to be true quills, to which only feathers are wanting to make them exactly resemble those of birds. They strike together with a noise as the animal walks; and it easily erects them in the same manner as the peacock spreads the feathers of its tail. The Indians use them to adorn many articles of dress and furniture, and dye them of various colors.

THE COUANDO, OR BRAZILIAN PORCUPINE.[1]



This animal is much smaller than the porcupine of the Old Continent; its head and muzzle is shorter; it has no tuft on its head, nor slit in the upper lip; its quills are somewhat shorter, and much finer; its tail is long; it is carnivorous, rather than frugivorous, and endeavors to surprise birds, small animals, and poultry, while the porcupine only feeds upon herbs, greens, fruits, &c. It sleeps all the day, like the hedge-hog, and only stirs out in the night. It climbs up trees, and hangs in the branches by its tail, which the porcupine cannot do. All travellers agree that its flesh is very good eating. It is easily tamed, and commonly lives in high places. These animals are found over all America, from Brazil and Guiana, to Louisiana, and the southern parts of Canada. While the porcupine is only to be found in the hottest parts of the Old Continent.

In transferring the name of porcupine to the couando, they have supposed and transmitted to him the same faculties, especially that of lancing his quills. Ray is the only person who has denied these circumstances, although they evidently appear at first view to be absurd.

[1] *Hystrix cuandu*, Desm.

THE URSON, OR CANADA PORCUPINE.[1]

This animal, placed by nature in the desert part of North America, to the east of Hudson's Bay, exists independent of, and far distant from, man. The urson might be called the *spiny beaver*, it being of the same size, the same country, and the same form of body; it has, like that, two long, strong, and sharp incisive teeth at the end of each jaw; its prickles are short, and almost covered with hair; for the urson, like the beaver, has a double coat; the first consists of long and soft hair, and the second, of a down, or felt, which is still softer or smoother. In the young ursons, the prickles are proportionably larger, more apparent, and the hair shorter and scarcer than in the adults.

This animal dislikes water, and is fearful of wetting himself. He makes his habitation under the roots of great hollow trees, sleeps very much, and chiefly feeds upon the bark of juniper. In winter, the snow serves him for drink; in summer, he laps water like a dog. The savages eat his flesh, and strip the bristles off the hide, which they make use of instead of pins and needles. Many of the trading Americans, also, depend upon them for food at certain seasons of the year.

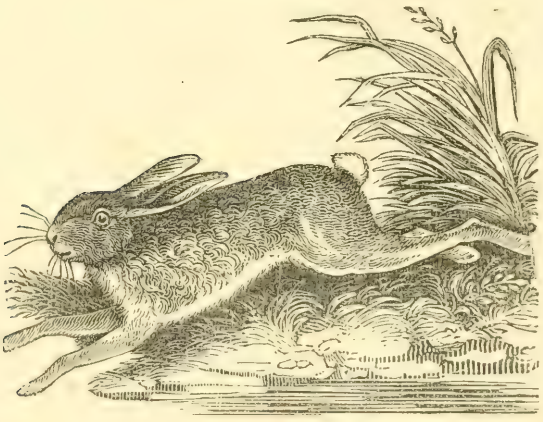
The following observations are from Dr Godman: "In the remote and unsettled parts of Pennsylvania, the porcupine is still occasionally found; but south of this state, it is almost unknown. According to Catesby, it never was found in that direction beyond Virginia, where it was quite rare. In the Hudson's Bay country, Canada, and New England, as well as in some parts of the western states, and throughout the country lying between the Rocky Mountains and the great western rivers, they are found in great abundance, and are highly prized by the aboriginals, both for the sake of their flesh and their quills, which are extensively employed as ornaments to their dresses, pipes, weapons, &c.

"The patience and ingenuity displayed by the Indian women, in ornamenting dresses, buffalo robes, moccasins, &c., can scarcely be appreciated by those who have never seen any of the articles thus adorned. We have already mentioned that these quills rarely exceed two inches and a half, or, at most, three inches in length; and are not larger in circumference than a moderate sized wheat straw. Yet we find large surfaces worked or embroidered in the neatest and most beautiful manner with these quills, which are dyed of various rich and permanent colors. In making this embroidery, they have not the advantage of a needle, but use a straight awl. Some of their work is done by passing the sinew of a deer, or other animal through a hole made with the awl, and at every stitch wrapping this thread with one or more turns of a porcupine quill. When they wind the quill

[1] *Hystrix dorsata*, Desm.

near its end, the extremity is turned into the skin, or is concealed by the succeeding turn, so as to appear, when the whole is completed, as if but a single strip had been used. In other instances, the ornament is wrought of the porcupine quills exclusively, and is frequently extremely beautiful, from its neatness and the good taste of the figures into which it is arranged. In general, however, the strong contrast of colors is the most remarkable effect aimed at. On some of the articles of dress, figures of animals, exhibiting much ingenuity, are formed by embroidering with these quills. The Philadelphia museum, so rich in objects of natural history, also boasts a most splendid and valuable collection of articles of dress, and implements of peace and war, peculiar to the various aboriginals of our country. Whoever wishes to see to what extent the quills of the porcupine are employed by these interesting people, and also to form a better idea of the number of porcupines that must be found in the trans-Mississipian regions, may be fully gratified by visiting this great institution."

THE HARE.[1]



Hares are universally and abundantly spread over the face of the whole earth; and rabbits, though they originated only in particular climates, do yet multiply so prodigiously in almost every place to which they are trans-

[1] *Lepus timidus*, Lin. The genus *Lepus* has four upper and two lower incisors; no canines; twelve upper and ten lower molars. Centre upper incisors large and wedge-shaped, with a longitudinal furrow in front, lower incisors square; molars crowned with transverse laminæ of enamel; ears and eyes large; fore legs short, with five toes; the hind feet long, with only four, covered with hair; tail short, erect; teats, from six to ten; cœcum very large.

ported, that it is no longer possible to extirpate them, and no small art is required in order to diminish their number. Some species of hares are migratory. They move, in flocks of five or six hundred, and often to a great distance, in search of food.

In those districts in England, which are reserved for the chase, four or five hundred hares are killed in the course of perhaps one day's sport. These animals multiply amazingly; they are in a condition to engender in all seasons, and before the first year of their life is expired. The females do not go above thirty or thirty-one days with their young.

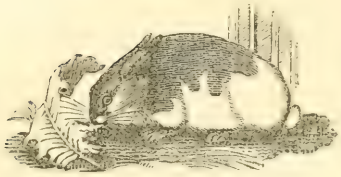
The young ones are brought forth with their eyes open; the mother suckles them for the space of twenty days; after which they separate themselves from her, and provide for their own subsistence. They do not withdraw themselves far from each other, nor from the place where they first drew breath; yet they live in solitude, and each composes for itself a form, at a little distance, perhaps sixty or eighty paces. Thus, when we find a young leveret in one place, we are almost sure of finding one or two more in the neighborhood. They feed more by night than by day; and their favorite articles of provision, are herbs, roots, leaves, fruit, and grain, but, above all, such plants as yield a milky juice. They even eat the bark of trees in winter. When they are reared at home, they are fed with lettuce and roots; but the flesh of these domestic hares is always of a bad flavor.

Hares sleep much, but always with their eyes open. They have no eyelashes, and seem to have but bad eyes. The eyes, however, are so prominent, that they can see both before and behind. Their hearing is exceedingly acute, and their ears are very large, compared with the size of their body. They move these long ears with great facility, and use them as a helm, in order to direct their course, which is so rapid, that they easily outstrip all other animals. As their fore legs are much shorter than their hind legs, they can more easily ascend than descend; for which reason, when they are pursued, their first object is to gain, if possible, some mountain. Their motion in running, is a kind of gallop; they proceed without making any noise, because their feet are plentifully covered with hair, even underneath; and perhaps they are the only animals which have hair growing within their mouths.

Hares live not above seven or eight years. They pass their lives in solitude and in silence; and never are known to exert their voice, but when they are forcibly laid hold of, tormented, or wounded. They are by no means so wild, as, by their habits, might be supposed; they are gentle, and susceptible of a species of improvement. As they have a good ear, as they rest on their hind feet of their own accord, and use their fore legs like arms, some have been so tutored as to beat a drum, to gesticulate in cadence, &c.

Hares may be domesticated, and they then display sagacity, affection, and no small share of curiosity. Cowper, the poet, has given an amusing account of three of them, which he kept for some years.

THE RABBIT.[1]



Though the hare and the rabbit are, externally as well as internally, very much alike, yet they form two distinct and separate species.

The fecundity of the rabbit is even greater than that of the hare; and, without crediting what Wotton has advanced, that one pair only, being left together in an island, produced six thousand in one year, it is certain, that these creatures multiply so prodigiously in countries which are proper for the breed, that the earth cannot furnish them with subsistence: they destroy herbs, roots, grain, fruit, and even trees and shrubs; and, were it not for the use made in Europe of the dog and the ferret, they would reduce the country to a desert. In the reign of Augustus, they became such a nuisance to the Balearic Islands, that the inhabitants were under the necessity of petitioning the emperor to send a military force to destroy them. The rabbit not only engenders and produces oftener than the hare, but it has more ways to escape from its enemies, and to avoid the sight of man.

This circumstance alone may suffice to prove that the rabbit is superior to the hare in point of sagacity. Both are alike in their conformation, and both have it in their power to dig retreats for themselves. Both are timid to an excess; but the one, possessed of less art, is contented with forming a residence on the surface of the earth, where it remains continually exposed; while the other, by a more improved instinct, takes the trouble to dig into the earth, and there to make itself an asylum; and so true is it, that they act in this case from a kind of reason or reflection, that we never see the domestic rabbit employed in the same work. Rabbits give the alarm to each other by thumping on the ground with one of their hind feet, which may be heard to a considerable distance.

The domestic rabbits, like all other animals, vary in their color; white, black, and gray, belong properly to nature. The black rabbits are the most scarce.

These animals are able to engender and produce at the age of five or six months. It is asserted, that they commonly attach themselves to one particular female, and never quit her. She goes with young thirty or

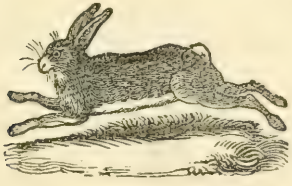
[1] *Lepus cuniculus*, Lin.

thirty-one days, and will produce five, six, and sometimes seven or eight at a birth. Like the doe-hare, she has a double matrix, and, of consequence, can have in her womb, at the same time, two separate litters. It appears, however, that superfœtations are less frequent in this species than in that of the hare.

A few days before they bring forth, they dig a fresh burrow, not in a right line, but in a crooked direction, at the bottom of which they make an excavation; after which they tear a quantity of hair from their bellies, and make a kind of bed for the use of their little ones. For the first two days they never quit them; they never stir abroad, unless forced to do so from necessity, and return as soon as ever they have taken their nourishment. At this season, they eat much, and very quick; and thus they tend and suckle their young for more than six weeks. Till then, the buck does not know them, nor does he enter the burrow which the doe has dug. Often, even when she quits it and leaves her little ones behind, she stops up the entry to it with earth, wet with her urine; but when they begin to venture to the edge of the hole, and to eat groundsel and other herbs, which the doe picks out for them, the buck begins to know them, to take them between his paws, to endeavor to give a gloss to their hair, to lick their eyes; and all of them, in succession, partake equally of his cares.

Though rabbits are found in America, they are not natives of it, but are descended from those which have been brought from Europe. The animal vulgarly called rabbit in this country, is the American hare, which we shall next describe.

THE AMERICAN HARE.[1]



This animal is found throughout this country, to as far north as the vicinity of Carlton House, in the Hudson's Bay country. According to the statement of Hearne, "they are not plentiful in the eastern parts of the northern Indian country, not even in those parts that are situated among

[1] *Lepus Americanus*, Gmel.

the woods; but to the westward, bordering on the southern Indian country, they are in some places pretty numerous, though by no means equal to what has been reported of them at York Fort, and some other settlements in the Bay." In parts of the Union, this hare is exceedingly common, and large numbers are annually destroyed for the sake of their flesh and fur.

During the daytime the hare remains crouched within its form, which is a mere space, of the size of the animal, upon the surface of the ground, cleared of grass, and sheltered by some overarching plant; or else its habitation is in the hollowed trunk of a tree, or under a collection of stones, &c.

It is at the earliest dawn, while the dewdrops still glitter on the herbage, or when the fresh verdure is concealed beneath a mantle of glistening frost, that the timorous hare commonly ventures forth in quest of food, or courses undisturbed over the plains. Occasionally during the day, in retired and little frequented parts of the country, an individual is seen to scud from the path, where it has been basking in the sun; but the best time for studying the habits of the animal is during moonlight nights, when the hare is to be seen sporting with companions in unconstrained gambols, frisking with delighted eagerness around its mate, or busily engaged in cropping its food. On such occasions the turnip and cabbage fields suffer severely, where these animals are numerous, though in general they are productive of serious injury. However, when the food is scarce, they do much mischief to the farmers, by destroying the bark on the young trees in the nurseries, and by cutting valuable plants.

The flesh of the American hare, though of a dark color, is much esteemed as an article of food. During the summer season they are lean and tough, and in many situations they are infested by a species of œstrus, which lays its eggs in their skins, producing worms of a considerable size. But in the autumnal season, and especially after the commencement of the frost, when the wild berries, &c., are ripe, they become very fat, and are a delicious article of food. In the north, during winter, they feed on the twigs of the pine and fir, and are fit for the table throughout the season. The Indians eat the contents of their stomachs, notwithstanding the food is such as we have just mentioned.

The American hare never burrows in the ground like the common European rabbit. When confined in a yard, our animal has been known to attempt an escape by scratching a hole in the earth near the fence or wall; but there are few wild animals, whatever may be their characters, that will not do the same, under similar circumstances, though in their natural condition they may never attempt to burrow. Such is the fact in relation to the American hare, which never burrows while it is a free tenant of the fields and woods. It has been said that this animal also occasionally ascends trees, which must be understood solely of its going up within the trunks of hollow trees, which it effects by pressing with its back and feet against

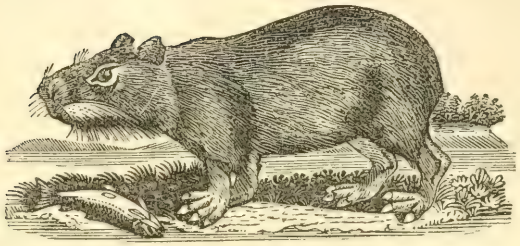
opposite sides of the hollow, ascending somewhat in the same manner that a sweep climbs a chimney.

The hare is not hunted in this country as in Europe, but is generally roused by a dog, and shot, or is caught in various traps and snares. In its movements our hare closely resembles the common hare of Europe, bounding along with great celerity, and would no doubt, when pursued, resort to the artifices of doubling, &c., so well known to be used by the European animal. The American hare breeds several times during the year, and in the Southern States even during the winter months, having from two to four or six at a litter.

In general, the hare is not devoid of the instinct necessary for its preservation, nor of sagacity sufficient to effect an escape from its enemies. It prepares for itself a form; and in winter, it chooses a spot which is exposed to the south, as in summer it does one which is situated to the north. It hides itself from view among hillocks of earth which are of the same color as its hair. "I have seen," says Du Fouilloux, "a hare so cunning, that, as soon as it heard the huntsman's horn, it started from its form, and, though at the distance of a quarter of a league from it, leaped to a pond, and there hid itself among the rushes, and thus escaped the pursuit of the dogs. I have seen a hare, which, after having run above two hours before the dogs, has dislodged another hare, and taken possession of its form. I have seen others swim over three ponds, of which the smallest was not less than eighty paces broad. I have seen others, which, after having been warmly chased for two hours, have entered a sheepcote, through the little opening under the door, and remained among the cattle. I have seen others, which, when the dogs have chased them, joined a flock of sheep in the field, and, in like manner, remained with them. I have seen others, which, when they heard the dogs, have concealed themselves in the earth. I have seen others, which have gone along one side of a hedge, and returned by the other; so that there was only the thickness of the hedge between the dogs and the hare. I have seen others, which, after they had been chased for half an hour, have mounted an old wall of six feet high, and taken refuge in a hole covered with ivy."

The nature of the soil has a great influence on these, as well as on all other animals; the hares of the mountains are larger and fatter than those of the plains, and are also of a different color; the former being browner on the body, and whiter about the neck than the latter, which are more inclined to red. On high mountains, and in the northern countries, they become white in the winter, and in summer recover their ordinary color.

THE CABIAI[1]



Is about the size of a hog of twelve months' growth. The head is longer; the eyes are larger; the snout, instead of being rounded, as in the hog, is split like that of a rabbit or hare, and furnished with thick, strong whiskers; the mouth is not so wide; the number and form of the teeth are different, for it is without tusks; like the peccary, it wants a tail, and, unlike to all others of this kind, is in a manner web-footed, and thus easily fitted for swimming and living in water. The hoofs before are divided into four parts, and those behind into three; between the divisions, there is a prolongation of the skin; so that the feet, when opened in swimming, can beat a great surface of water.

This animal, thus made for the water, swims there like an otter, seeks the same prey, and seizes the fish with its feet and teeth, and carries them to the edge of the lake to devour them with the greater ease. It lives also upon fruits, corn, and sugar-canes. As its legs are broad and flat, it often sits upright upon its hind legs. Its cry resembles more the braying of an ass than the grunting of a hog. Its color is a deep reddish brown above, and fawn beneath. It seldom stirs out but at night, and almost always in company, without going far from the sides of the water in which it preys. It can find no safety in flight; and, in order to escape the enemies which pursue it, it plunges into the water, remains at the bottom a long time, and rises at such a distance, that the hunters lose all hopes of seeing it again. It is fat; and the flesh is tender, but, like that of the otter, rather of a fishy taste; the head, however, is not bad; and this agrees with what is said of the beaver, whose exterior parts have a taste like fish.

The cabiai is quiet and gentle; it is neither quarrelsome nor ferocious with other animals. It is easily tamed, comes at call, and willingly follows the hand that feeds it. We do not know the time of their bringing forth their young, their growth, and consequently the length of life of this animal. They are very common in Guiana, as well as in Brazil, in Amazonia, and in all the lower countries of South America.

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[1] *Hydrochærus capybara*, Lin. The genus *Hydrochærus* has two upper and two lower incisors; no canines; ten upper and eight lower molars. Molars composed of laminæ; eyes large; ears rounded; fore feet with four, the hinder ones with three palmated toes; no tail; two mammæ; hair scattered and bristly.

THE GUINEA-PIG [1]

Though originally a native of the warm climates of Brazil and Guinea, lives, however, and breeds in temperate and even cold countries, provided it is properly taken care of. Its skin is of little or no value; and the flesh, though people may, and actually do eat it, is very indifferent food; a circumstance which might, in some measure, be removed, were they to be reared in warrens, where they might have air, space to range in, and a proper choice of herbs. Those which are kept in houses have nearly the same taste as the house rabbit; and of those which have passed the summer in a garden, the taste is less disagreeable, but is still insipid.

The Guinea-pig is much less than the rabbit; its upper lip is only half divided; it has two cutting teeth in each jaw; large and broad ears; its hair is of different colors, white, varied with orange and black, in irregular patches. It has no tail, and is very restless, from which latter circumstance it derives the epithet affixed to one of its names.

The growth of these animals is not entirely completed till the expiration of eight or nine months; though indeed it is in apparent bulk and fat that they chiefly increase till then, the developement of the solid parts being finished before the age of five or six months. The female never goes with young above three weeks; and she has been known to bring forth when only two months old. The first litter is not so numerous as the subsequent litters. It does not amount to more than four or five; the second amounts to five or six, and the rest to seven or eight, and even to ten or eleven. She does not suckle her young longer than twelve or fifteen days. Thus these animals produce at least every two months; and as those which are newly born produce in the same manner, their multiplication is astonishing. In one year a thousand might be obtained from a single couple, did they not frequently destroy each other, and perish from the cold and wet.

The Guinea-pig feeds on all sorts of herbs, and especially on parsley, which it prefers even to bran, flour, or bread. Of apples and other fruits it is also exceedingly fond. Like the rabbit, it eats precipitately, little at a time, but very often. It whines somewhat like a young pig.

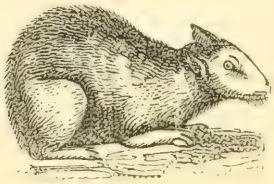
So cleanly are Guinea-pigs, that much of their time is spent in licking and smoothing the fur of each other, and of the little ones; and should the

[1] *Cavia cobaya*, Desm. The genus *Cavia* has two upper and two lower incisors; no canines; eight upper and eight lower molars. Body thick; muzzle short, compressed; eyes large; ears round; legs short, four toes on the fore feet, three on the hind feet, not palmated; no tail; two ventral teats.

latter chance to be dirtied, the mother will never again suffer them to come near her. If kept in a room, it seldom crosses the floor, but creeps round by the wall.

These animals are so delicate, that it is with difficulty they undergo the rigors of winter. When they feel the cold, they assemble together, press close to one another, and in this situation are frequently found dead.

THE AGOUTI.[1]



This animal is about the size of a hare, and has been considered, erroneously, as a kind of rabbit, or large rat, by the generality of nomenclators. As it has the hair of a hog, so also it has the voracious appetite of that animal. It eats indiscriminately of all things; and when satiated, it hides the remainder, like the dog or the fox, for a future occasion.

It does not, like the rabbit, dig a hole in the ground, but burrows in the holes of trees. Its ordinary food consists of the roots of the country, potatoes, yams, and such fruits as fall from the trees in autumn. It uses its fore paws like the squirrel, to carry its food to its mouth; and as its hind feet are longer than the fore ones, it runs very swiftly upon plain ground, or up a hill, but upon a descent it is in danger of falling. Its sight is excellent; its hearing equals that of any other animal; and whenever it is whistled to, it stops to hearken. The flesh is dressed like that of a sucking pig, and of such as are well fed, is tolerable food, though it has always a peculiar taste, and is rather rough.

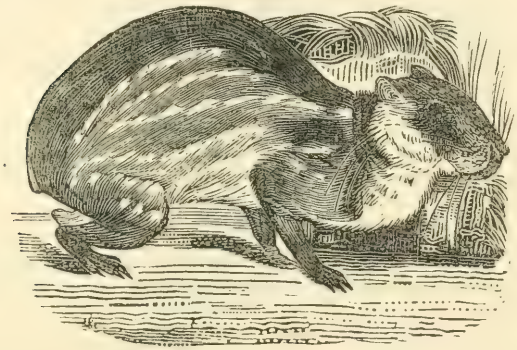
It is hunted by dogs; and whenever it goes into a sugar ground, where the canes cover the place, it is easily overtaken; for it is embarrassed every step it takes, so that a man may easily come up with it and kill it, without any other assistance than a stick. When in the open country, it usually runs with great swiftness before the dogs until it gains its retreat, within which it continues to hide, and nothing but filling the hole with smoke can force it out. For this purpose the hunter burns faggots or straw at the entrance,

[1] *Dasyprocta acuti*, Lin. The genus *Dasyprocta* has two upper and two lower incisors; no canines; eight upper and eight lower molars. Head rather elongated; forehead flat; muzzle thick; eyes large and projecting; fore feet with four toes and a rudimentary thumb; hind legs longer than those before, with three toes and strong nails; sole of the foot naked and callous.

and conducts the smoke in such a manner that it fills the whole cavity. While this is doing, the poor little animal seems sensible of its danger, begs for quarter with a most plaintive cry, but seldom quits its hole till the utmost extremity.

The agouti seems to be a native of the south parts of America; nor is it at all known in the Old Continent. It is, however, very common in Brazil, Guiana, St Domingo, and all the islands around. To the cold and temperate regions of America this animal is a stranger.

THE PACA, OR SPOTTED CAVY[1]



Is an animal of the New World, who digs a burrow like a rabbit, to which he has been compared, though there is scarcely any likeness between these two animals; he is much larger than the rabbit, and even than the hare; he has a round head, and the snout short; he is fat and bulky, and by the form of his body he is more like a pig, as well as by grunting, waddling, and the manner of eating; for he does not use, as the rabbit does, his fore feet to carry food to his mouth; but grubs up the earth like the hog, to find his subsistence. The color of the back is dark brown, or liver colored; but is lighter on the sides, which are beautifully marked with lines of white spots, running in parallel directions from its throat to its rump; those on the upper part of the body are perfectly distinct; the belly is white. Its head is large; its ears short and naked; its eyes full, and placed high in its head, near the ears; it has two strong yellow cutting teeth in each jaw; its mouth is small; its upper lip divided; and it has long whiskers on its lips,

[1] *Cælogenys sobriger*, Desm. The genus *Cælogenys* has two upper and two lower incisors; no canines; eight upper and eight lower molars. Five toes on all the feet; the external and internal toe behind being nearly rudimentary; nails conical, strong, for digging; cheek pouches; a naked tubercle in place of a tail; two pectoral and two unguinal mammæ.

and on each side of its head, under the ears. Its legs are short, with four toes on the fore, and three on the hind foot; and it has no tail.

These animals inhabit the banks of rivers, and are found in damp and hot places of South America; the flesh is very good to eat, and excessively fat; their skin, also, is eaten as that of a pig. The natives of Brazil consider the flesh to be a great delicacy; a perpetual war is therefore carried on against these animals. Hunters find it very difficult to take them alive; and when they are surprised in their burrows, which have two openings, they defend themselves, and bite with great rage and inveteracy. When pursued, they take to the water, and escape by diving. If attacked by dogs, it defends itself vigorously. Their skin, though covered with short and rough hair, is valuable, because it is spotted on the sides. These animals bring forth young in abundance: men, and animals of prey, destroy a great quantity of them, and yet the species is still numerous. They are peculiar to South America, and are found no where in the Old Continent.

ORDER SEVENTH—EDENTATA.

Animals of this order have no incisors in either jaw; sometimes canines and molars, or molars only; often no teeth at all; extremities terminated with toes, in number variable, armed with strong nails; orbital and temporal fossæ united.

THE UNAU,[1] AND THE AI,[2] OR SLOTH.

These two animals have the epithet of *sloth* given to them both, by most authors, on account of their slowness, and the difficulty with which they walk. The unau, or two-toed sloth, has no tail, and only two nails on the fore feet. The ai, or three-toed sloth, has a short tail, and three nails on every foot. The nose of the unau, is likewise much longer, the forehead higher, and the ears longer than those of the ai. It differs also in the hair. As for its interior, its viscera are both formed and situated differently; but the most distinctive, and, at the same time, the most singular character, is, that the unau has forty-six ribs, while the ai has but twenty-eight. This alone supposes two species, quite distinct one from the other; and these forty-six ribs, in an animal whose body is so short, is a kind of excess or

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[1] *Bradypus didactylus*, Lin.

[2] *Bradypus tridactylus*, Lin. The genus *Bradypus* has two upper and two lower canines; four upper and six lower molars. Canines higher than the molars, pyramidal and pointed; molars cylindrical; head small, rounded; muzzle truncated; neck short; nostrils at the extremity of the muzzle; anterior extremities longer than the posterior, with two or three united toes, terminated by very long, robust nails; fur thick and harsh, with the hair of the fore arms directed upwards; stomach membranous, divided into many sacs; intestines short; no cœcum.

error in nature; for, even in the largest animals, and those whose bodies are relatively longer than they are thick, not one of them is found to have so many. The elephant has only forty, the dog twenty-six, and the human species twenty-four, &c. This difference in the construction of the unau and the ai, supposes a greater distance between these two kinds than there is between that of the cat and the dog, which have the same number of ribs; for the external differences are nothing in comparison with the internal ones, which are the causes of the others. These animals inhabit South America, and are especially numerous in Brazil and Guiana.

Waterton gives the following account of the sloth: "This singular animal is destined by nature to be produced, to live, and to die, in the trees; and, to do justice to him, naturalists must examine him in his upper element. He is a scarce and solitary animal, and, being good food, he is never allowed to escape. He inhabits remote and gloomy forests, where snakes take up their abode, and where cruelly stinging ants and scorpions, and swamps, and innumerable thorny shrubs and bushes, obstruct the steps of civilized man. Were you to draw your own conclusions from the descriptions which have been given of the sloth, you would probably suspect that no naturalist had actually gone into the wilds with the fixed determination to find him out and examine his haunts, and see whether nature has committed any blunder in the formation of this extraordinary creature, which appears to us so forlorn and miserable, so ill put together, and so totally unfit to enjoy the

blessings which have been so bountifully given to the rest of animated nature; for, as it has formerly been remarked, he has no soles to his feet, and he is evidently ill at ease when he tries to move on the ground; and it is then that he looks up in your face with a countenance that says, 'Have pity on me, for I am in pain and sorrow.'

"It mostly happens that Indians and negroes are the people who catch the sloth, and bring it to the white man. Hence it may be conjectured that the erroneous accounts we have hitherto had of the sloth have not been penned down with the slightest intention to mislead the reader, or give him an exaggerated history, but that these errors have naturally arisen by examining the sloth in those places where nature never intended that he should be exhibited.

"However, we are now in his own domain. Man but little frequents these thick and noble forests, which extend far and wide on every side of us. This, then, is the proper place to go in quest of the sloth. We will first take a near view of him. By obtaining a knowledge of his anatomy, we shall be enabled to account for his movements hereafter, when we see nim in his proper haunts. His fore legs, or, more correctly speaking, his arms, are apparently much too long, while his hind legs are very short, and look as if they could be bent almost to the shape of a cork-screw. Both the fore and hind legs, by their form, and by the manner in which they are joined to the body, are quite incapacitated from acting in a perpendicular direction, or in supporting it on the earth, as the bodies of other quadrupeds are supported, by their legs. Hence, when you place him on the floor, his belly touches the ground. Now, granted, that he supported himself on his legs like other animals, nevertheless he would be in pain, for he has no soles to his feet, and his claws are very sharp and long, and curved, so that, were his body supported by his feet, it would be by their extremities; just as your body would be were you to throw yourself on all fours, and try to support it on the ends of your toes and fingers — a trying position. Were the floor of glass, or of a polished surface, the sloth would actually be quite stationary; but as the ground is generally rough, with little protuberances upon it, such as stones, or roots of grass, &c., this just suits the sloth, and he moves his fore legs in all directions, in order to find something to lay hold of; and when he has succeeded, he pulls himself forward, and is thus enabled to travel onwards, but, at the same time, in so tardy a manner as to acquire him the name of sloth.

"Indeed, his looks and his gestures evidently betray his uncomfortable situation; and, as a sigh every now and then escapes him, we may be entitled to conclude that he is actually in pain.

"Some years ago I kept a sloth in my room for several months. I often took him out of the house, and placed him upon the ground, in order to have an opportunity of observing his motions. If the ground were rough, he would pul himself forwards by means of his fore legs, at a pretty good

pace, and he invariably shaped his course towards the nearest tree. But if I put him upon a smooth and well trodden part of the road, he appeared to be in trouble and distress; his favorite abode was the back of a chair; and, after getting all his legs in a line upon the topmost part of it, he would hang there for hours together, and often, with a low and inward cry, would seem to invite me to take notice of him.

"The sloth, in its wild state, spends its whole life in the trees, and never leaves them but through force or accident. An all-ruling Providence has ordained man to tread on the surface of the earth, the eagle to soar in the expanse of the skies, and the monkey and squirrel to inhabit the trees; still these may change their relative situations without feeling much inconvenience; but the sloth is doomed to spend his whole life in the trees; and, what is more extraordinary, not *upon* the branches, like the squirrel and the monkey, but *under* them. He moves suspended from the branch, he rests suspended from it, and he sleeps suspended from it. To enable him to do this, he must have a very different formation from that of any other known quadruped.

"Hence, his seemingly bungled conformation is at once accounted for; and, in lieu of the sloth leading a painful life, and entailing a melancholy and miserable existence on its progeny, it is but fair to surmise that it enjoys life just as much as any other animal, and that his extraordinary formation and singular habits are but further proofs to engage us to admire the wonderful works of Omnipotence.

"It must be observed, that the sloth does not hang head downwards like the vampire. When asleep, he supports himself on a branch parallel to the earth. He first seizes the branch with one arm, and then with the other; and, after that, brings up both his legs, one by one, to the same branch; so that all four are in a line; he seems perfectly at rest in this position. Now, had he a tail, he would be at a loss to know what to do with it in this position; were he to draw it up with his legs, it would interfere with them; and were he to let it hang down, it would become the sport of the winds. Thus his deficiency of tail is a benefit to him; it is merely an apology for a tail, scarcely exceeding an inch and a half in length.

"I observed when he was climbing, he never used his arms both together, but first one and then the other, and so on alternately. There is a singularity in his hair, different from that of all other animals, and, I believe, hitherto unnoticed by naturalists; his hair is thick and coarse at the extremity, and gradually tapers to the root, where it becomes fine as the finest spider's web. His fur has so much the hue of the moss which grows on the branches of the trees, that it is very difficult to make him out, when he is at rest.

"The male of the three-toed sloth has a longitudinal bar of very fine black hair on his back, rather lower than the shoulder-blades; on each side of this black hair there is a space of yellow hair, equally fine; it has the

appearance of being pressed into the body, and looks exactly as if it had been singed. If we examine the anatomy of his fore legs, we shall immediately perceive by their firm and muscular texture, how very capable they are of supporting the pendent weight of his body, both in climbing and at rest; and, instead of pronouncing them a bungled composition, as a celebrated naturalist has done, we shall consider them as remarkably well calculated to perform their ordinary functions.

"As the sloth is an inhabitant of forests within the tropics, where the trees touch each other in the greatest profusion, there seems to be no reason why he should confine himself to one tree alone for food, and entirely strip it of its leaves. During the many years I have ranged the forests, I have never seen a tree in such a state of nudity; indeed I would hazard a conjecture, that by the time the animal has finished the last of the old leaves, there would be a new crop on the part of the tree he had stripped first, ready for him to begin again, so quick is the process of vegetation in these countries.

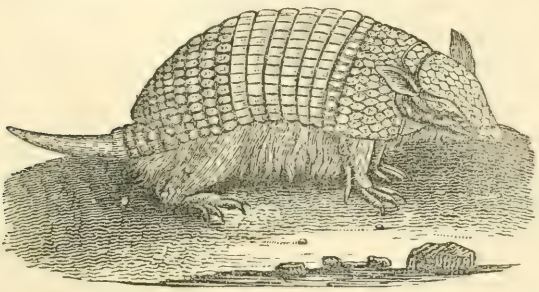
"There is a saying among the Indians, that when the wind blows, the sloth begins to travel. In calm weather he remains tranquil, probably not liking to cling to the brittle extremity of the branches, lest they should break with him in passing from one tree to another; but as soon as the wind rises, the branches of the neighboring trees become interwoven, and then the sloth seizes hold of them, and pursues his journey in safety. There is seldom an entire day of calm in these forests. The trade wind generally sets in about ten o'clock in the morning, and thus the sloth may set off after breakfast, and get a considerable way before dinner. He travels at a good round pace; and were you to see him pass from tree to tree, as I have done, you would never think of calling him a sloth.

"Thus it would appear that the different histories we have of this quadruped are erroneous on two accounts; first, that the writers of them, deterred by difficulties and local annoyances, have not paid sufficient attention to him in his native haunts; and, secondly, they have described him in a situation in which he was never intended by nature to cut a figure, I mean on the ground. The sloth is as much at a loss to proceed on his journey upon a smooth and level floor, as a man would be who had to walk a mile in stilts upon a line of feather-beds.

"One day, as we were crossing the Essequibo, I saw a large two-toed sloth on the ground upon the bank; how he got there nobody could tell; the Indian said he had never surprised a sloth in such a situation before; he would hardly have come there to drink, for both above and below the place, the branches of the trees touched the water, and afforded him an easy and safe access to it. Be this as it may, though the trees were not above twenty yards from him, he could not make his way through the sand, in time to escape before we landed. As soon as we got up to him, he threw himself on his back, and defended himself in a gallant style with his

fore legs. 'Come, poor fellow,' said I to him, 'if thou hast got into a hobble to day, thou shalt not suffer for it; I'll take no advantage of thee in misfortune; the forest is large enough both for thee and me to rove in; go thy ways up above, and enjoy thyself in these endless wilds; it is more than probable thou wilt never have another interview with man. So, fare thee well.' On saying this, I took up a large stick which was lying there, held it for him to hook on, and then conveyed him to a high and stately mora. He ascended with wonderful rapidity, and in about a minute he was almost at the top of the tree. He now went off in a side direction, and caught hold of the branch of a neighboring tree; he then proceeded towards the heart of the forest; I stood looking on, lost in amazement at his singular mode of progress. I followed him with my eye till the intervening branches closed in betwixt us; and then I lost sight forever of the two-toed sloth. I was going to add, that I never saw a sloth take to his heels in such earnest; but the expression will not do, for the sloth has no heels."

THE SIX-BANDED ARMADILLO.[1]



Under the general name of armadillo, we may reckon several species which seem to us really distinct; in all of them the animal is protected by a crust resembling bone; it covers the head, the neck, the back, the flanks, the buttocks, and the tail to the very extremity. This crust is covered outwardly by a thin skin, sleek and transparent; the only parts that are not sheltered by this buckler, are the throat, the breast, and the belly, which presents a white grainy skin, like that of a plucked fowl; and, in considering these parts with attention, you will perceive the appearance of scales which are of the same substance as the crust. This crust is, however, not

[1] *Dasypus sexcinctus*, Lin. The genus *Dasypus* has two upper and four lower incisors, sometimes none; molars varying in the several species from twenty-eight to sixty-eight, simple, cylindrical, separate, without enamel on the inner side; head long; mouth and eyes small; body enveloped in a hard scaly shell in three compartments covering the head, body, and tail, with moveable transverse bands between them; five toes on the hind feet; four or five on the fore feet, with long nails for digging.

of one piece, like that of the turtle; it consists of several parts joined to each other by as many membranes, which put this armor in motion. The number of these natural bands does not depend on the age of the animal; for the young armadillo and the adults have in the same species the same number. Father d'Abbeville has distinguished six species of the armadillo, but the principal difference between them consists in the number of bands or divisions in the armor of the different species. The six-banded armadillo differs from its fellows in being also of a smaller size, not larger than that of a young pig, and in its tail being shorter.

The armadilloes in general are innocent, harmless animals; if they can penetrate into gardens, they will eat melons, potatoes, pulse and roots. Though used originally to the hot climates of America, they live in temperate regions. They walk quickly, but they can neither leap, run, nor climb up trees; so they cannot escape by flight; they have then no other resource but to hide themselves in their holes, or, if they are at too great a distance from their subterraneous habitations, they contrive to dig one before they are overcome; for the mole is not more expert in digging the ground. They are sometimes caught before they are out of sight, and they then make such a resistance, that the tail is broken without bringing out the body; in order to take them without mutilation, the burrow must be opened; they are then caught without making any resistance. When they find themselves in the hands of their pursuers, they roll themselves up into a ball, and are placed near the fire, to force them to stretch out their coat of mail; which, hard as it is, as soon as it is touched with the finger, the animal receives so quick an impression, that he contracts instantaneously. When they are in deep burrows, the method of forcing them out is to smoke them, or to let water run down the hole; the former process, however, is not always successful, as while his pursuer digs, the animal digs also, and so effectually closes up the hole, by throwing up the earth backwards, that the smoke is excluded. Some pretend they remain under ground above three months without venturing out: it is true, that they remain in their holes in the daytime, and never go out but in the night to seek for their subsistence. The armadillo is hunted with small dogs, who soon overtake him; but he stops before they have reached him, and contracts himself; in this condition he is taken and carried off. If he finds himself on the brink of a precipice, he escapes the dogs and the hunters, by rolling himself up, and letting himself fall down like a ball, without injury or prejudice to his scales.

"The armadillo," says Mr Waterton, "is very common in these (the South American) forests; he burrows in the sand hills like a rabbit. As it often takes a considerable time to dig him out of his hole, it would be a long and laborious business to attack each hole indiscriminately, without knowing whether the animal were there or not. To prevent disappointment, the Indians carefully mine the mouth of the hole, and put a short stick down it. Now if, on introducing the stick, a number of musquitoes come out, the

Indians know to a certainty that the armadillo is in it; whenever there are no musquitoes in the hole, there is no armadillo."

These animals are fat, and very prolific; the female brings forth, as it is reported, four young ones every month, which makes their species very numerous. They are good to eat, and are easily taken with snares laid for them on the banks of the rivers, and in the marshy grounds, which they inhabit in preference. It is pretended, that they are not afraid of the bite of the rattlesnake; it is likewise pretended, that they live in peace with these reptiles, which are often found in their holes. The savages apply their scales to different purposes, and make of them baskets, boxes, and other small vessels light and solid. The armadillo is only found in South America.

THE TAMANOIR, THE TAMANDUA, AND THE FOURMILLIER, OR ANT-EATER.

South America produces three species of animals, with a long snout, a small mouth, and no teeth; their tongues, of a round form, are remarkably long; with which they catch the ants, which are their principal food. On coming to an ant hill, the animal scratches it up with his claws, and then protrudes his slender tongue, which has the appearance of an exceedingly long earth-worm. It is covered with a viscous saliva. To this the ants adhere, and, by retracting it, he swallows thousands of them. He also tears up the nests of woodlice, and often climbs the trees in pursuit of them, and of the wild bees and their honey. The first of these ant-eaters is that which the Brazilians call tamandua guacu, or great tamandua, to whom the French settled in America have given the name of tamanoir. The English call it

THE GREAT ANT-EATER.[1]

This animal is about four feet in length from the extremity of the snout to the origin of the tail; his head is fourteen or fifteen inches long, his snout stretches out to a great length; his tail, two feet and a half long, is covered with rough hair, which is more than a foot in length; his neck is short; his head narrow; his eyes black and small; his ears round; his tongue thin, more than two feet long, which he folds again in his mouth, after he draws it entirely out. His legs are but one foot high; the fore legs are a little higher and more slender than those behind; he has round feet; the

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[1] *Myrmecophaga jubata*, Lin. Animals of the genus *Myrmecophaga* are utterly toothless; they have the head elongated; muzzle tapering to a point; tongue long, protractile; toes united, four before and five behind, or two before and four behind, armed with strong nails; two pectoral and two ventral mammæ; tail long; sometimes prehensile.

fore feet are armed with four claws, the two middle ones are the longest, those behind have five claws. The hair of his head and body is black and white; this animal turns his tail up on his back, and covers with it his whole body, when he is inclined to sleep, or wants to shelter himself from the rain or the heat of the sun. The long hair of his tail and of his body is

not round in all its extent; it is flat towards the end, and feels like dry grass. He waves his tail frequently and hastily when he is irritated, but it hangs down when he is composed, and he sweeps the way with it as he goes. The tamanoir walks slowly; a man can easily overtake him in running; his feet seem less calculated to walk than to climb, and to fasten round bodies; and he holds so fast a branch or a stick, that it is not possible to snatch either from him. The second of these animals is that which the Americans call

THE TAMANDUA.[1]

He is much smaller than the tamanoir; he is not above eighteen inches from the extremities of the snout to the rump; his head is five inches long, his snout crooked, and underneath flat and long; he has a tail ten inches long, without hair at the end; his ears are erect, and about an inch in length; his tongue is round, eight inches long, and placed in a sort of gutter or hollow canal within the lower jaw; his legs are not above four inches in height, his feet are of the same form, and have the same number of claws as the tamanoir. He climbs up and holds fast a branch, or a stick, like the tamanoir, and his march is equally slow. He does not cover himself with his tail, which cannot shelter him, being almost bare; the hair of the fore part is shorter than that of the tamanoir; when he sleeps he hides his head under his neck and his fore legs. The third of these animals is that which the naturalists of Guiana call

[1] *Myrmecophaga tridactyla*, Lin.

THE WATIRIWAOU,[1]

And the French fourmillier, or ant-eater. He is still much smaller than the tamandua, being not above six or seven inches in length from the extremity of the snout to the tail; his head is two inches long; the snout is not near so long as that of the tamanoir, or the tamandua; his tail is seven inches in length, is bent underneath, and bare at the end; his tongue is narrow, long, and flat; his neck is almost bare; the head is large in proportion to the body; his eyes placed low, at a little distance from the corners of the mouth; his ears are small and hidden by the hair; his legs are but three inches in height; the fore feet have no more than two claws, the outward is much longer than the inward one; the hind feet have four claws; the hair of the body is about nine inches long; he feels smooth; his color is shining, diversified with red and yellow; his feet are not made to walk, but to climb up, and to take hold of branches of trees, on which he hangs himself by the extremity of his tail.

These three animals, so different in the size and proportions of the body, have, nevertheless, many things in common, as to conformation and their natural instinct. All three feed upon ants, and suck honey and other liquid and viscous substances; they gather quickly crumbs of bread and small pieces of meat; they are tamed and domesticated easily; they can subsist a long while without food; they do not swallow all the liquor which they keep in their mouth — one part of it issues out of their nostrils; they commonly sleep in the daytime, and change their station in the night; they go so slowly, that a man may overtake them easily whilst running in open ground. The savages eat their flesh, which has, however, an unsavory taste.

The tamanoir looks at a distance like a great fox, and for that reason some travellers call him the American fox; he is strong enough to defend himself against a large dog, and even a jaguar; when he is attacked he fights standing on his hind legs, like the bear, and makes use of his fore claws, which are murdering weapons, for his protection; afterwards he lies on his back to use his hind legs, and in this situation he is almost invincible; he fights with obstinacy to the last extremity, and even after he has put his adversary to death, he keeps hold of him a long while. He is covered with long bushy hair, and a very thick skin; besides, his flesh is remarkably hard, and he seldom loses his life in these engagements.

The tamanoir, the tamandua, and the fourmillier, are natives of the hottest climates only of America; they are found in Brazil, in Guiana, and in the country of the Amazons, &c.; they do not breed in Canada, nor in the other frozen regions of the New World, and do not belong consequently to the Ancient Continent.

We copy the following from "Waterton's Wanderings."

"The ants have their enemies, as well as the rest of animated nature.

[1] *Myrmecophaga didactyla*, Lin.

Amongst the foremost of these stand the three species of ant-bears. The smallest is not much larger than a rat; the next is nearly the size of a fox; and the third, a stout and powerful animal, measuring about six feet from the snout to the end of the tail. He is the most inoffensive of all animals, and never injures the property of man. He is chiefly found in the inmost recesses of the forest, and seems partial to the low and swampy parts near creeks, where the Troely tree grows. There he goes up and down in quest of ants, of which there is never the least scarcity; so that he soon obtains a sufficient supply of food with very little trouble. He cannot travel fast; man is superior to him in speed. Without swiftness to enable him to escape from his enemies, without teeth, the possession of which would assist him in self-defence, and without the power of burrowing in the ground, by which he might conceal himself from his pursuers, he is still capable of ranging through these wilds in perfect safety; nor does he fear the fatal pressure of the serpent's fold, nor the teeth of the famished jaguar. Nature has formed his fore legs wonderfully thick, strong and muscular, and armed his feet with three tremendous sharp and crooked claws. Whenever he seizes an animal with these formidable weapons, he hugs it close to his body, and keeps it there till it dies through pressure, or want of food. Nor does the ant-bear, in the mean time, suffer from want of aliment, as it is a well known fact, that he can go longer without food than perhaps any other animal, except the land tortoise. His skin is of a texture that perfectly resists the bite of a dog: his hinder parts are protected by thick and shaggy hair, while his immense tail is large enough to cover his whole body.

"The Indians have a great dread of coming in contact with the ant-bear; and after disabling him in the chase, they never think of approaching him till he is quite dead. It is perhaps on account of this caution, that naturalists have never yet given to the world a true and correct drawing of this singular animal, or described the peculiar position of his fore feet when he walks or stands. If, in taking a drawing from a dead ant-bear, you judge of the position in which he stands from that of all other terrestrial animals, the sloth excepted, you will be in error. Examine only a figure of this animal, in books of natural history, or inspect a stuffed specimen in the best museums, and you will see that the fore claws are just in the same forward attitude as those of a dog, or a common bear, when he walks or stands. But this would be an intolerable attitude for the ant-bear. The length and curve of his claws cannot admit of such a position. When he walks or stands, his feet have somewhat the appearance of clubhands. He goes entirely on the outer side of his fore feet, which are quite bent inwards, the claws collected into a point, and going under the foot. In this position he is quite at ease; while his long claws are disposed of in a manner to render them harmless to him, and are prevented from becoming dull and worn, like those of the dog, which would inevitably be the case, did their points come in actual contact with the ground: for his claws have not the

retractile power which enables animals of the feline species to preserve the sharpness of their claws on the most flinty path. A slight inspection of the fore feet of the ant-bear will easily convince you of the mistakes that artists and naturalists have fallen into; for you will perceive that the whole outer side of his foot is not only deprived of hair, but is hard and callous; proof positive of its being in perpetual contact with the ground. On the contrary the inner side of the bottom of his foot is soft and rather hairy.

"There is another singularity in the anatomy of the ant-bear. He has two very large glands situated below the roof of the tongue. From these is emitted a glutinous liquid, with which his long tongue is lubricated when he puts it into the ants' nests. These glands are of the same substance as those found in the lower jaw of the woodpecker. The secretion from them, when wet, is very clammy and adhesive; but on being dried, it loses those qualities, and you can pulverize it betwixt your finger and thumb; so that in dissection, if any of it has got upon the fur of the animal, allow it to dry there, and then it may be removed, without leaving any stain behind. The ant-bear is a pacific animal. As his habits and haunts differ materially from those of any other animal in the forest, he might live to a good old age, and die in peace at last, were it not that his flesh is good food. On this account the Indian wages perpetual war with him, and as he cannot escape by flight, he falls an easy prey to the poisoned arrow. If he be ever closely attacked by a dog, he throws himself on his back, and if he can catch hold of his enemy with his tremendous claws, the invader is sure to pay for his rashness with the loss of life."

THE PANGOLIN[1] AND PHATAGIN;[2] OR, THE SHORT AND LONG-TAILED MANIS.

These animals are commonly known under the name of scaly lizards; but they are not only of another genus, but even of another class than the lizards, which are oviparous reptiles, while the pangolin and the phatagin are viviparous quadrupeds.

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[1] *Manis crassicaudata*, Geoff.

[2] *Manis longicaudata*, Geoff. The genus *Manis* is entirely toothless; the body is elongated, covered with strong, corneous, triangular, and imbricated scales, and capable of rolling into a ball; muzzle long; tongue protractile; feet with five toes, formed for digging; tail long.

All the lizards are wholly covered, even under the belly, with a sleek speckled skin, resembling scales; but the pangolin and the phatagin have no scales under their throat, on the breast, or the belly; the phatagin, like the other quadrupeds, has hair on all these under parts of the body; the pangolin has nothing but a smooth skin without hair. The scales with which all the other parts of the body of these two animals are clothed and covered, do not stick to the skin; they are only fixed and inherent to it underneath; they are moveable, like the prickles of the porcupine. These scales are so large, so hard, and so sharp, that they frighten and discourage all animals of prey; on collision they will strike fire like flint; it is an offensive armor which wounds while it resists.

The most cruel and the most voracious animals, such as the tiger and the panther, make but useless efforts to devour these armed animals; they tread upon them, roll them; but when they attempt to seize them, they are grievously wounded; they can neither terrify them by violence, nor bruise, nor smother them with their weight.

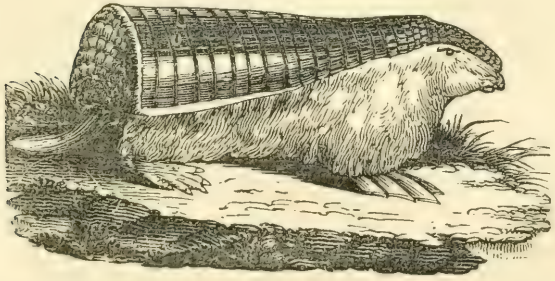
When the pangolin and the phatagin contract themselves, they do not take, as the hedgehog, a globular and uniform figure; they form an oblong coat of armor; but their thick and long tail remains outward, and encircles their bodies. This exterior part, by which it seems these animals might otherwise be seized, carries its own defence; it is covered with scales equally hard and sharp with those with which the body is clothed, and as it is convex above, and flat below, in the form of half a pyramid, the sides are covered with square scales folded in a right angle, as thick and as sharp as the others; so that the tail seems to be still more strongly armed than the body, the under parts of which are unprovided with scales.

The pangolin, or short tailed manis, is larger than the phatagin, or long tailed kind; his fore feet are covered with scales, but the phatagin's feet and part of his fore legs have none, being only clothed with hair. The pangolin has also larger scales, thicker, more convex, and not so close as those of the phatagin, which are armed with three sharp points; on the contrary, the scales of the pangolin are without points, and uniformly sharp. The phatagin is hairy upon the belly; and the pangolin has no hair on that part of his body, but between those scales which cover his back some thick and long hair issues like the bristles of a hog, which are not found on the back of the phatagin.

The pangolin is from six to eight feet in length, including his tail; the tail is very near as long as the body, though it appears shorter when young; the scales are not then so large nor so thick, and of a pale color, which is deeper when the animal is adult; they acquire such a hardness, that they resist a musket ball. Like the ant-eaters, the pangolin and the phatagin live chiefly upon ants; they have also a very long tongue, a narrow mouth, and without apparent teeth; their body and their tail are also very long, and the claws of their feet very near of the same length and the same form, but

equal in number. Like the ant-eater, the pangolin is also toothless, and has a long cylindrical tongue, which it uses in the same manner as that animal to procure the insects on which it subsists. When the pangolin approaches an ant hill, it lies down near it, concealing as much as possible the place of its retreat, and stretching out its long tongue among the ants, keeping it for some time immovable. These little creatures, allured by its shining appearance, and the unctuous substance with which it is smeared, instantly gather upon it in great numbers; and when the pangolin supposes that it has a sufficiency, it quickly withdraws the tongue, and swallows them at once. This operation it repeats till it is satisfied, or till the ants, grown more cautious, will be no longer allured to their destruction. The ant-eaters are found in America; the pangolin and the phatagin, in the East Indies, and in Africa, where the negroes call them quogelo. They eat their flesh, which they reckon a delicate, wholesome food; they also use their scales for different purposes. Their mode of killing it is by beating it with clubs. The pangolin and the phatagin have nothing forbidding but their figure; they are gentle, harmless, and innocent; they feed upon insects only; they never run fast, and can only escape the pursuit of men by hiding themselves in hollow rocks, or in holes which they dig for themselves; they are two extraordinary species, not numerous, nor very useful; their odd form seems to place them as an intermediate class betwixt the quadrupeds and the reptiles.

THE CHLAMYPHORUS[1]



has been discovered only within the last five years. From the tip of the nose to the root of the tail, it measures but five inches and a quarter; its

[1] *Chlamyphorus truncatus*, HARLAN. This animal, which is the only one of the genus, has sixteen upper and as many lower teeth, all molars; the two first in each jaw pointed, the rest flat and cylindrical; shell composed of a series of transverse plates; toes five before and behind, with compressed nails; tail short, turned downward.

height at the shoulder is only one inch and three quarters, and the length of its tail is one inch. This is rather less than half the size of the three banded armadillo. It is a native of South America.

THE DUCK-BILLED PLATYPUS.[1]

New Holland is the country that produces this anomalous animal, one of the strangest sports of nature, as it combines the bill of a bird with the usual characteristics of a quadruped. So singular is this union, that it was at first supposed to be the trick of some person, for the purpose of imposing on collectors. When the creature was first discovered, it received the allusive name of ornithorynchus paradoxicus; but it has since been denominated the platypus anatinus, or duck-billed platypus. It has a depressed body, somewhat resembling that of an otter in miniature, which is covered with a soft fur, dark brown above, and of a ferruginous white beneath. The head is flattish, and the snout so exactly resembles that of some broad billed species of duck, that it might easily be mistaken for such. The tail is flat, furry, and of the same color as the body. The length of the whole animal, from the tip of the beak to that of the tail, is thirteen inches; of the beak, an inch and a half. The legs are very short, and terminate in a broad web, which on the fore feet extends to a considerable distance beyond the claws, but on the hind feet reaches no further than the roots of the claws. On the upper part of the head, on each side, a little beyond the beak, are situated two oval white spots, in the lower part of each of which the eyes are embedded.

From the general form of this animal, and particularly its bill and webbed feet, it may naturally be concluded, that it resides in watery situations; that it has the habit of digging or burrowing in the banks of rivers, or under ground; and that its food consists of aquatic plants and animals

ORDER EIGHTH.—PACHYDERMATA.

Animals of this order have three or two kinds of teeth; four extremities, with the toes variable in number, and furnished with strong nails or hoofs; no clavicles; organs of digestion not disposed for ruminating. This order commences the series of hoofed quadrupeds.

[1] *Platypus anatinus.* This genus, which comprises only two individuals yet known, has four upper and four lower molars, the teeth are fibrous, and fixed only in the gum; a horny beak resembling a duck's bill; nostrils contiguous, opening at the end of the upper mandible; cheek pouches; feet webbed, pentadactyle; with a spur on the hind ones in the male; tail short, broad at the base.

FAMILY I.—PROBOSCIDEA.

In this family the individuals have their upper incisors in the form of elongated tusks; molars compound and in small number; five toes on all the feet; nose prolonged into a proboscis.

THE ELEPHANT.[1]

The human race excepted, the elephant is the most respectable of animals. In size, he surpasses all other terrestrial creatures, and in understanding he is inferior only to man. Of all the brute creation, the elephant, the dog, the ape, and the beaver, are most admirable for their sagacity; but the genius of the dog is only borrowed, being instructed by man in almost every thing he knows. The monkey has only the appearance of wisdom, and the beaver is only sensible with regard to himself, and those of his species. The elephant is superior to them all three: he unites all their most eminent qualities. The hand is the principal organ of the monkey's dexterity; the elephant with his trunk, which serves him instead of arms and hands, with which he can lift up, and seize the smallest, as well as the largest objects, carry them to his mouth, place them on his back, hold them, or throw them far off, has the same dexterity as the monkey, and at the same time the tractableness of the dog. He is, like him, susceptible of gratitude, capable of a strong attachment. He uses himself to man without reluctance, and submits to him, not so much by force, as by good treatment; he serves him with zeal, intelligence, and fidelity. In fine, the elephant, like the beaver, loves the society of his equals, and makes them understand him. They are often seen to assemble together, disperse, act in concert, and if they do not erect buildings, and do not work in common, it is, perhaps, for want of room only, and tranquillity; for men have very anciently multiplied in all the regions inhabited by the elephant; he consequently lives in fear and anxiety, and is no where a peaceful possessor of a space large and secure enough to establish his habitation on a settled spot. Every being in nature has his real price, and relative value; to judge of both in the elephant, we must allow him at least the judgment of the beaver, the dexterity of the monkey, the sentiment of the dog, and, to add to these qualifications, the peculiar advantages of strength, size, and longevity. We must not forget his arms, or his defence, with which he can pierce through and conquer the lion. We must observe, that he shakes the ground at every step; that with his trunk he roots up trees; that with the strength

[1] The genus *Elephas*, of which there are only two species, has two upper incisors or tusks; four upper and four lower molars. Tusks slightly arched towards their extremity, composed of ivory cased in a crust of enamel; molars composed of vertical and transverse laminæ covered by enamel; five toes on all the feet; nose elongated into a cylindrical proboscis, moveable in all directions, with a moveable appendix at the termination, serving the purpose of a finger; head very large; neck short; eyes small, lateral; ears extremely flat and very large; body large and massive; tail short, tufted at the end; two mammæ.

of his body he makes a breach in a wall; that being terrible by his force, he is invincible by the resistance only of his enormous mass, and by the thickness of the leather which covers it; that he can carry on his back a tower armed in war, with a number of men; that he alone moves machines, and carries burthens, which six horses cannot move. To this prodigious strength he joins courage, prudence, coolness, and an exact obedience. He preserves moderation even in his most violent passion; he is more constant than impetuous in love; in anger he does not forget his friends; he never attacks any but those who have given him offence; he remembers favors as long as injuries. Having no taste for flesh, and feeding chiefly upon vegetables, he is not naturally an enemy to other animals; he is beloved by them all, since all of them respect him, and have no cause to fear him. For these reasons, men have had at all times a veneration for this great, this first of animals. The ancients considered the elephant as a prodigy, a miracle of nature; they have much exaggerated his natural faculties; they attribute to him, without hesitation, not only intellectual qualities, but moral virtues.

In a wild state, the elephant is neither bloody nor ferocious; his manners are social; he seldom wanders alone; he commonly walks in company, the oldest leads the herd, the next in age drives them, and forms the rear; the young and the weak are in the middle. The females carry their young, and hold them close with their trunks. They only observe this order, however, in perilous marches, when they go to feed on cultivated lands. They walk or travel with less precaution in forests and solitary places, but still keeping at such a moderate distance from each other, as to be able to give mutual assistance, and seasonable warnings of danger. Some, however, straggle, and remain behind the others; none but these are attacked by hunters, for a small army would be requisite to assail the whole herd, and they could not conquer without a great loss of men. It is even dangerous to do them the least injury; they go straight to the offender, and, notwithstanding the weight of their body, they walk so fast that they easily overtake the lightest man in running; they pierce him through with their tusks, or seize him with their trunks, throw him against a stone, and tread him under their feet; but it is only when they have been provoked, that they become so furious and so implacable. It is said, that when they have been once attacked by men, or have fallen into a snare, they never forget it, and seek for revenge on all occasions. As they have an exquisite sense of smell, perhaps more perfect than any other animal, owing to the large extent of their nose, they smell a man at a great distance, and could easily follow him by the track. These animals are fond of the banks of rivers, deep valleys, shady places, and marshy grounds; they cannot subsist a long while without water, and they make it thick and muddy before they drink. They often fill their trunks with it, either to convey it to their mouth, or only to cool their nose, and to amuse themselves in sprinkling it around

them. They cannot support cold, and suffer equally from excessive heat: for, to avoid the burning rays of the sun, they penetrate into the thickest forests. They also bathe often in the water; the enormous size of their body is rather an advantage to them in swimming, and they do not swim so deep in the water as other animals; besides, the length of their trunk, which they erect, and through which they breathe, takes from them all fear of being drowned.

Their common food is roots, herbs, leaves, and young branches; they also eat fruit and corn, but they have a dislike to flesh and fish. When one of them finds abundant pasture, he calls the others, and invites them to come and feed with him. As they want a great quantity of fodder, they often change their place, and when they find cultivated lands, they make a prodigious waste; their bodies being of an enormous weight, they destroy ten times more with their feet, than they consume for their food, which may be reckoned at the rate of one hundred and fifty pounds of grass daily. As they never feed but in great numbers, they waste a large territory in about an hour's time; for this reason, the Indians and the negroes take great pains to prevent their visits, and to drive them away, by making a great noise, and great fires; notwithstanding these precautions, however, the elephants often take possession of them, drive away the cattle and men, and sometimes pull down their cottages. It is difficult to frighten them, as they are little susceptible of fear; nothing can stop them but fireworks, and crackers, thrown amongst them, the sudden effect of which, often repeated, forces them sometimes to turn back. It is very difficult to part them, for they commonly attack their enemies all together, proceed unconcerned, or turn back.

The female elephant goes two years with young; she only brings forth one at a time, which has teeth as soon as brought forth. He is then larger than a boar; yet his tusks are not visible, they appear soon after, and at six months old are some inches in length; at that age, the elephant is larger than an ox, and the tusks continue to increase till he is advanced in years.

It is very easy to tame the elephant. But there is no domestic elephant that has not been wild before. The manner of taking, taming, and bringing them into submission, deserves particular attention. In the middle of forests, and in the vicinity of the places which they frequent, a large space is chosen, and encircled with palisadoes; the strongest trees of the forest serve instead of stakes, to which cross pieces of timber are fastened, which support the other stakes; a man may easily pass through this palisado; there is another great opening, through which the elephant may go in, with a trap hanging over it, or a gate which is shut behind him. To bring him to that inclosure, he must be enticed by a tame female, ready to take the male; and when her leader thinks she is near enough to be heard, he obliges her to indicate by her cries the condition she is in. The wild male answers immediately, and begins his march to join her: she repeats her call now

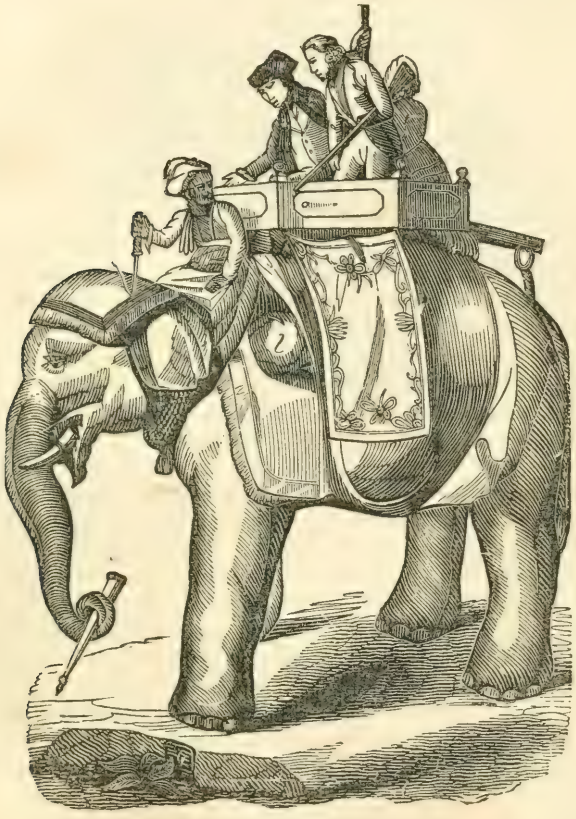
and then, and arrives first to the first inclosure, where the male, following her track, enters through the same gate. As soon as he perceives himself shut up, his ardor vanishes, and when he discovers the hunters, he becomes furious. They throw at him ropes with a running knot to stop him; they fetter his legs and his trunk, they bring two or three tame elephants, led by dexterous men, and try to tie them with the wild elephant, and at last, by dint of dexterity, strength, terror, and caresses, they succeed in taming him in a few days.

The elephant, once tamed, becomes the most tractable and the most submissive of all animals; he conceives an affection for his leader, he caresses him, and seems to guess whatever can please him. In a little time he understands the signs, and even the expression of sounds; he distinguishes the tone of command, that of anger or good nature, and acts accordingly. He never mistakes the words of his master. He receives his orders with attention, executes them with prudence and eagerness, without precipitation; for his motions are always measured, and his character seems to participate of the gravity of his body. He is easily taught to bend the knee to assist those who will ride on his back. He caresses his friends with his trunk, and salutes with it the persons he is directed to take notice of. He makes use of it to lift burdens, and helps to load himself. He has no aversion to being clothed, and seems to delight in a golden harness or magnificent trappings. He is easily put to the traces of carts, and draws ships upon occasion. He draws evenly, without stopping, or any marks of dislike, provided he is not insulted by unseasonable correction; and provided his driver seems to be thankful for the spontaneous exertion of his strength. His leader is mounted on his neck, and makes use of an iron rod, crooked at the end, with which he strikes him gently on the head to make him turn or increase his pace. But often a word is sufficient, especially if he has had time to make himself well acquainted with his leader, and has a confidence in him. His attachment is sometimes so strong and so lasting, and his affection so great, that commonly he refuses to serve under any other person; and he is known to have died of grief for having in anger killed his governor.

If it is true, as has been affirmed, that the elephant lives two hundred years, and that he begets when he is one hundred and twenty years old, each couple brings forth forty young in that space of time. Besides, having nothing to fear from other animals, and little even from men, who take them with great difficulty, the species has not decreased, and is generally dispersed in all the southern parts of Africa and Asia.

From time immemorial, the Indians made use of elephants in war. Amongst those nations unacquainted with the European military discipline, they were the best troops of their armies; and as long as battles were decided by mere weapons, they commonly vanquished. Yet, we see in history, that the Greeks and Romans used themselves soon to those mon-

sters of war; they opened their ranks to let them go through; they did not attempt to wound them, but threw all their darts against their leaders, who were forced to surrender, and to calm the elephants when separated from their troops; and now that fire is become the element of war, and the principal instrument of death, the elephants, who are afraid of the noise and the fire of the artillery, would be rather an incumbrance in battle, and more dangerous than useful.



In those regions, however, where our cannons and murdering arts are yet scarcely known, they fight still with elephants. At Cochin, and in parts of Malabar, they do not make use of horses, and all those who do not fight on foot are mounted upon elephants. In Tonquin, Siam, and Pegu, the king, and all the grandees, never ride but upon elephants. On festival days they are preceded and followed by a great number of these animals richly

caparisoned, and covered with the richest stuffs. On comparing the relations of travellers and historians, it appears that elephants are more numerous in Africa than in Asia; they are there also less mistrustful, not so wild, and, as if they knew the unskilfulness and the little power of the men with whom they have to deal in this part of the world, come every day without fear to their habitations.

The following extracts are furnished by Major Denham: "While I was thus employed, Maramy came galloping up, saying that he had found three very large elephants, grazing to the south-east, close to the water; when he came within a few hundred yards of them, all the persons on foot, and my servant on a mule, were ordered to halt, while four of us, who were mounted, rode up to these stupendous animals.

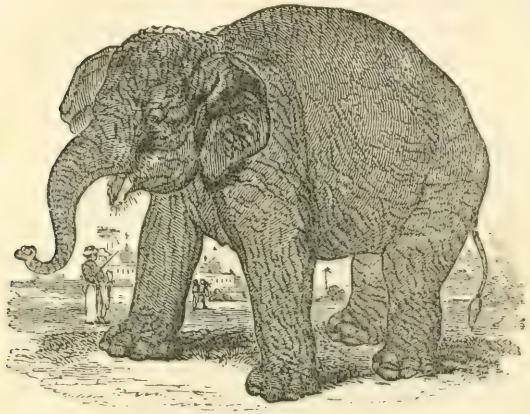
"The Shiekh's people began screeching violently; and although, at first, the elephants appeared to treat our approach with contempt, yet they soon moved off, erecting their ears, and giving a roar that shook the ground under us. One was an immense fellow, I should suppose sixteen feet high; the other two were females, and moved away rather quickly, while the male kept in the rear, as if to guard their retreat. We wheeled swiftly round him; and Maramy casting a spear at him, which struck him just under the tail, and seemed to give him about as much pain as when we prick our finger with a pin the huge beast threw up his proboscis in the air with a loud roar, and from it cast such a volume of sand, that, unprepared as I was for such an event, nearly blinded me. The elephant will sometimes rush upon a man and horse, and after choking them with dust, will destroy them in an instant.

"As we had cut him off from following his companions, he took the direction leading to where we had left the mule and the footmen; they quickly fled in all directions, and my man Columbus was so alarmed, that he did not get the better of it for the whole day. We pressed the elephant now very close, riding before, behind, and on each side of him; and his look sometimes, as he turned his head, had the effect of instantly checking the speed of my horse; his pace never exceeded a clumsy rolling walk, but was sufficient to keep our horses in a short gallop. I gave him a ball from each barrel of my gun, at about fifty yards distance; but the first, which struck him on the body, failed in making the least impression. After giving him another spear, which flew off his tough hide without exciting the least sensation, we left him to his fate.

"News was soon brought us that eight elephants were at no great distance, and coming towards us; it was thought prudent to chase them away, and we all mounted for that purpose. They appeared unwilling to go, and did not even turn their backs till we were quite close, and had thrown several spears at them; the flashes from the pan of the gun, however, seemed to alarm them more than any thing; they retreated very majestically, first throwing out as before, a quantity of sand. A number of the birds here

called *tuda*, were perched upon the backs of the elephants; these resemble a thrush in shape and note, and were represented to me, as being extremely useful to the elephant in picking off the vermin from those parts which it is not in his power to reach.'

THE ASIATIC ELEPHANT.[1]



In general, the elephants of Asia are of a larger size, and superior in strength to those of Africa; in particular, those of Ceylon, who exceed in courage and sagacity all those of Asia. Probably they owe these qualifications to their education, more improved in Ceylon than any where else. They differ also in other particulars, so as to constitute them a different species. "His head," says Mr Bennett, "is more oblong, and his forehead presents in the centre a deep concavity between two lateral and rounded elevations; that of the African being round and convex in all its parts. The teeth of the former are composed of transverse vertical laminæ of equal breadth, while those of the latter form rhomboidal or lozenge shaped divisions. The ears of the Asiatic are also smaller, and descend no lower than his neck, and he exhibits four distinct toes on his hind feet. The African on the contrary, is furnished with ears of much greater size, descending to his legs, and no more than three toes are visible on his posterior extremities." The individual, which is the subject of the wood cut, is believed to be little more than three years old.

The elephants of the Indies easily carry burdens of three or four thousand weight; the smallest, that is, those of Africa, lift up freely with their trunks

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[1] *Elephas Indicus*, Cuv.

burdens of two hundred pounds weight, and place them on their shoulders they take in this trunk a great quantity of water, which they throw out around them at seven or eight feet distance; they can carry burdens of more than a thousand weight upon their tusks; with their trunk they break branches of trees, and with their tusks they root out the trees. One may judge of heir strength by their agility, considering at the same time the bulk of their body; they walk as fast as a small horse on the trot, and when they run, they can keep up with a horse on full gallop, which seldom happens in their wild state, except when they are provoked by anger, or frightened. The tame elephants travel easily, and without fatigue, fifteen or twenty leagues a day; and when they are hurried, they may travel thirty-five or forty leagues. They are heard at a great distance, and may be followed very near on the track, for the traces which they leave on the ground are not equivocal; and on the ground where the steps of their feet are marked they are fifteen or eighteen inches in diameter.

When the elephant is taken care of, he lives a long while even in captivity. Some authors have written, that he lives four or five hundred years; others, two or three hundred; and the most credible, one hundred and twenty, thirty, and even one hundred and fifty years. Whatever care, however, is taken of the elephant, he does not live long in temperate countries, and still less in cold climates. The elephant which the king of Portugal sent to Louis XIV., in 1668, and which was then but four years old, died in his seventeenth, in January, 1681, and lived only thirteen years in the menagerie of Versailles, where he was treated with care and tenderness, and fed with profusion. He had every day four pounds of bread, twelve pints of wine, two buckets of porridge, with four or five pounds of bread, two buckets of rice boiled in water, without reckoning what was given to him by visitors; he had, besides, every day one sheaf of corn to amuse himself; for, after he had eaten the corn ears, he made a kind of whip of straw, and used it to drive away the flies; he delighted in breaking the straw in small bits, which he did with great dexterity with his trunk; and, as he was led to walk daily, he plucked the grass and eat it.

The common color of the elephant is ash gray, or blackish. The white are extremely scarce; some have been seen at different times in the Indies, where also some are found of a reddish color.

The elephant has very small eyes, compared with his enormous size, but they are sensible and lively; and what distinguishes them from all other animals, is their pathetic, sentimental expression. He seems to reflect, to think, and to deliberate; and never acts till he has examined and observed several times, without passion or precipitation, the signs which he is to obey. Dogs, the eyes of which have much expression, are animals too lively to distinguish their successive sensations; but as the elephant is naturally grave and sedate, one may read in his eyes the order and outward appearance of his interior affections.

He has a quick ear, and this organ is outwardly, like that of smelling, more marked in the elephant than in any other animal; his ears are very large, even in proportion to his body; they are flat, and close to the head, like those of a man; they commonly hang down, but he raises them up, and moves them with great facility; he makes use of them to wipe his eyes, and to cover them against the inconveniency of dust and flies. He delights in the sound of instruments, and seems to like music; he soon learns to beat time, and to move accordingly; he seems animated by the beat of the drum and the sound of trumpets; he has an exquisite smell, and is passionately fond of perfumes of all sorts, and of fragrant flowers; he selects them one after another, and makes nosegays, which he smells with eagerness, and then carries them to his mouth as if he intended to taste them.

His sense of feeling centres in his trunk; but it is as delicate and as distinct in that sort of hand as in that of man; this trunk, composed of membranes, nerves, and muscles, is, at the same time, a member capable of motion, and an organ of sense; the animal can not only move and bend it, but he can shorten, lengthen, and turn it all ways. The extremity of this trunk terminates by an edge, which projects above like a finger; it is with this sort of finger that the elephant does whatever we do with ours, he picks up from the ground the smallest pieces of money; he gathers nuts and flowers, choosing them one after another; he unties knots, opens and shuts doors, turning the keys, and bolts them; he learns to draw regular characters with an instrument as small as a pen.

Although the elephant has a more retentive memory, and more intelligence than any other animal, he has the brain smaller than most of them; he is, at the same time, a miracle of intelligence and a monster of matter; his body is very thick, without any suppleness; the neck is short and very stiff; the head small and deformed; the ears of an excessive diameter; and the nose is of a still more disproportionate length; the eyes are too small as well as the mouth; his legs are like massive pillars, straight and stiff the feet so short and so small, that he seems to have none; the skin is hard thick, and callous. All these deformities are remarkable, as all of them are exhibited on a large scale; and they are more disagreeable to the eye, as most of them have no other example in the creation; no other animal having either the head, the feet, the nose, the ears, or the tusks, made or placed like those of the elephant.

The elephant is yet singular in the conformation of the feet and the texture of the skin. He is not clothed with hair like other quadrupeds; his skin is bare; some bristles issue out of the chops; they are very thin on the body, and thicker on the eyelids, on the back part of the head, within the ears, the thighs, and the legs. The epidermis, or outside skin, hard and callous, has two sorts of wrinkles, some hollow, others prominent. In man, and other animals, the epidermis sticks every where close to the skin. In the elephant, it is only fastened by some points, like two quilted stuffs one above the other. This epidermis is naturally dry, and soon acquires three or four lines of thickness, by the crusts which are generated one above the other drying up. It is this thickness of the epidermis which produces the *elephantiasis*, or dry leprosy, to which man, whose skin is bare, like that of the elephant, is sometimes subject. This distemper is very common to elephants; and, to prevent it, the Indians take care to rub them often with oil, and to preserve the skin supple by frequent bathing. It is rather tender where it is not callous; and the elephant is so fearful of the sting of the flies that he not only employs his natural motions, but even the resources of his intelligence, to get rid of them; he makes use of his tail, of his ears, of his trunk, to strike them; he contracts his skin wherever he can, and squeezes them to death betwixt the wrinkles. He cleans his skin by rubbing it with pumice stones, and afterwards pours on it perfumed oil and colors. The conformation of the feet and legs is also singular, and different in the elephant from that of other animals; the fore legs seem to be higher than those behind, yet the hind legs are the longest; they are not bent like the hind legs of a horse or an ox, the thighs of which seem to be of the same piece with the buttocks; their knee is very near the belly, and the foot so high and so long, that it seems to make a great part of the leg. In the elephant, on the contrary, this part is very short, and touches the ground: he has the knee, like man, in the middle of the leg, not near the belly. This foot, so short and so small, is divided into five toes, which are all covered with a skin, none appearing outwardly; one sees only a sort of claws

the number of which varies, though that of the toes is constant; for he has always five to each foot, and commonly also five claws; but sometimes he has no more than four, or even three; and, in this case, they do not correspond exactly with the extremity of the fingers.

The ears of the elephant are very long; his tail is not longer than the ear; it is commonly near three feet in length; it is rather thin, sharp, and garnished at the extremity with a tuft of large, black, shining, and solid bristles, which are as large and as strong as wire; and a man cannot break them with his hands, as they are elastic and pliant. This tuft of hair is an ornament which the negro women are particularly fond of; and they attribute to it some particular virtue, according to their superstitious notions; an elephant's tail is sometimes sold for two or three slaves; and the negroes often hazard their lives to cut and snatch it from the living animal.

The largest elephants of the Indies, and the eastern coasts of Africa, are fourteen feet high; the smallest, which are found in Senegal, and in the other western parts of Africa, are not above ten or eleven feet; and those which have been brought young into Europe, were not so high. That at the menagerie at Versailles, which came from Congo, was but seven feet and a half high in his seventeenth year. During thirteen years that he lived in France, he did not grow above a foot; so that at the age of four, when he was sent, he was only six feet and a half high.

In order to give a complete idea of the nature and intelligence of this singular animal, we shall insert here some particulars communicated by the Marquis of Montmirail. The Indians make use of the elephant to carry artillery over mountains; and it is then that he gives the greatest proofs of his intelligence. He acts in the following manner:—When the oxen, yoked two and two, endeavor to draw up the mountain the piece of artillery, the elephant pushes the breech of the gun with his forehead; and at every effort that he makes, he supports the carriage with his knee, which he places near the wheel; and it seems as if he understands what is said to him. When his leader employs him in some hard labor, he explains what is his work, and the reasons which ought to engage him to obey. If the elephant shows an aversion to comply, the *cornac* (so his leader is called) promises to give him arrack, or something he likes; then the animal agrees to every thing proposed; but it is dangerous to forfeit his word; more than one *cornac* has been the victim of his deception. An instance of this happened in the Deccan, which deserves to be recorded; and, however incredible it may appear, it is exactly true. An elephant had been revenged of his cornac by killing him. His wife, witness of this catastrophe, took her two children and threw them to the feet of the animal, still furious; telling him, *Since thou hast killed my husband, take also my life, and that of my children.* The elephant stopped short, grew calm, and, as if he had been moved with regret and compassion, took with his trunk the largest of the two children, placed it on his neck, adopted him for his cornac, and would have no other leader

If the elephant is vindictive, he is no less grateful. A soldier of Pondicherry, who commonly carried to one of these animals a certain measure of arrack every time that he received his pay, having one day drank more than common, and seeing himself pursued by the guard, who threatened to conduct him to prison, took refuge under the elephant, and slept there. It was in vain that the guard attempted to draw him out from this asylum; the elephant defended him with his trunk. The next day the soldier, become sober, was struck with terror to lie under an animal of this enormous bulk. The elephant, who, no doubt, perceived his consternation, caressed him with his trunk, to remove his fears, and made him understand that he might depart freely.

The elephant falls sometimes into a sort of a frenzy, which deprives him of his tractableness, and makes him extremely formidable. This commonly happens in the spring season. He is commonly killed on the first symptoms of madness, for fear of mischief. Sometimes he is tied with heavy chains in hopes that he will come to himself; but when he is in his natural state, the most acute pains cannot engage him to do any harm to persons who have not offended him. An elephant, furious with the wounds which he had received in battle at Hambour, ran through the fields, and cried out in the most hideous manner. A soldier, who, notwithstanding the warning of his companions, could not fly, perhaps, because he was wounded, remained in his way; the elephant was afraid to trample him under his feet, took him with his trunk, placed him gently on one side of the road, and continued his march. The gentlemen of the Academy of Sciences have also communicated to us some facts which they have learned from those who governed the elephant at the menagerie of Versailles; and these facts seem to deserve a place.

"The elephant seemed to discern when any person made a fool of him; and he remembered the affront to be revenged of it the first opportunity. Having been balked by a man, who feigned to throw something into his mouth, he struck him with his trunk, and broke two of his ribs; afterwards he trampled him under his feet, and broke one of his legs; and having kneeled down, he tried to thrust his tusks into the man's belly, which, however, went into the ground on both sides of the thigh, which was not wounded. He bruised another man, by squeezing him against the wall for a similar mockery. A painter was desirous to draw him in an extraordinary attitude, which was, to keep his trunk erect, and the mouth open. The servant of the painter, to make him remain in that attitude, threw fruits into his mouth; but afterwards he deceived him, which provoked his indignation; and, as if he had known, that the cause of this deception was the painter's desire of having him drawn, he was revenged on his master, by throwing with his trunk a great quantity of water, which spoiled the paper intended for his design."

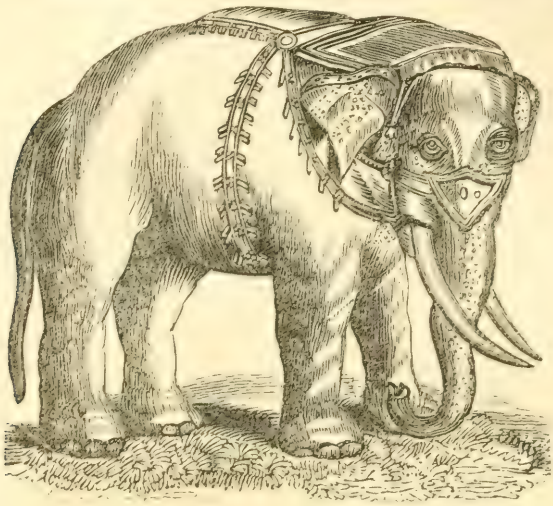
He made less use of his strength than of his dexterity, which was such, that he untied, with great facility, a double leather string which fastened his

leg, with his mouth untying it from the buckle's tongue, and after this buckle had a small string twisted around it, with divers knots, he untied them all, without breaking any thing. One night, that he had thus disentangled himself from his leather strings, he broke open so dexterously the door of his lodge, that his governor was not waked by the noise. He went thence into divers yards of the menagerie, breaking open doors that were shut, and pulling down the stone work, when the passage was too narrow for him and thus he went into the lodges of other animals, terrifying them to such a degree, that they ran away to hide themselves in the most remote part of the park. In fine, to omit nothing of what may contribute to make all the natural faculties of this animal perfectly known, as well as his acquired knowledge, we shall add some facts, extracted from the most credible authors.

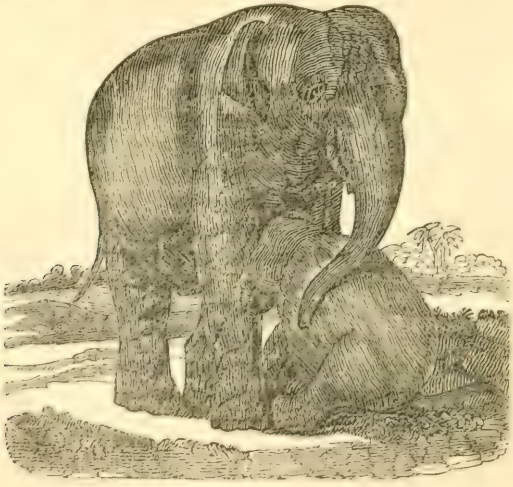
"Of five elephants," says Tavernier, "which hunters had taken, three escaped, although their bodies and their legs were fastened with chains and ropes. These men told us a very surprising circumstance, if we can believe it, which is, that when once these elephants have been caught, and eluded the snares of their adversaries, if they are compelled to go into the woods, they are mistrustful, and break with their trunk a large branch, with which they sound the ground before they put their foot upon it, to discover if there are any holes on their passage, not to be caught a second time; which made the hunters, who related this singularity, despair of catching again the three elephants who had escaped. We saw the other two which they had caught; each of them was betwixt two tame elephants; and around the wild elephants were six men, holding spears. They spoke to these animals in presenting them something to eat, and telling them, in their language, *Take this and eat it*. They had small bundles of hay, bits of black sugar, or rice boiled in water, with pepper. When the wild elephant refused to do what he was ordered, the men commanded the tame elephants to beat him, which they did immediately; one striking his forehead with his ; and when he seemed to aim at revenge against his aggressor, another struck him; so that the poor wild elephant perceived he had nothing to do but to obey."

"I have observed several times," says Edward Terry, "that the elephant does many things which are rather an indication of human reasoning, than a simple, natural instinct. He does whatever his master commands him. If he orders him to frighten any person, he advances towards him with the same fury as if he would tear him to pieces; and when he comes near him, he stops short, without doing him any harm. If the master wishes to affront another, he speaks to the elephant, who takes with his trunk dirty water, and throws it at his face. The Mogul has elephants for the execution of criminals condemned to death. If their leader bids them to dispatch these wretches soon, they tear them to pieces in a moment with their feet: on the contrary, if he commands them to make these criminals languish, they break their bones one after another and make them suffer torments as cruel as those of the wheel."

The celebrated white elephant, which is the only one in the possession of the king of Ava, is of a cream color, and has no appearance of disease or debility. It was taken in 1806, when young, in the forests of Pegu, and is



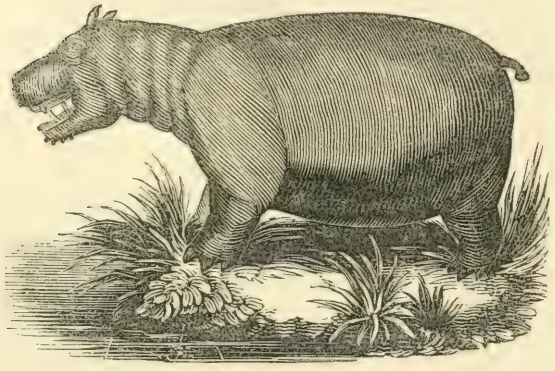
about twenty-seven years old. Both the court and people consider it peculiarly inauspicious to want a white elephant; hence the repute in which they are held, and the anxiety to obtain them. The capture of a white elephant is consequently highly rewarded.



It has been asserted by Buffon and others, that the young elephant sucks

with its trunk. It is now ascertained that it sucks with its mouth like other animals. Mr Cross says, "in sucking, the young elephant always grasps the nipple, which projects horizontally from the breast, with the side of his mouth. I have very often observed this; and so sensible are the attendants of it, that with them it is a common practice to raise a small mound of earth, about six or eight inches high, for the young one to stand on, and thus save the mother the trouble of bending her body every time she gives suck, which she cannot readily do when tied to her picket." M. Foucher d'Obsonville, who had also observed the young elephant playing with the teat of the mother with his trunk, attributes the prevalent error to this circumstance.

THE HIPPOPOTAMUS.[1]



Although this animal has been celebrated from the earliest ages, it was, notwithstanding, but imperfectly known to the ancients. It was only towards the sixteenth century that we had some precise indications on the subject.

In comparing the descriptions which we have observed in different travellers, the hippopotamus appears to be an animal whose body is longer and thicker than that of the rhinoceros; but his fore legs are much shorter. His head is short, and thick in proportion to the body. He has no horns, neither on the nose, like the rhinoceros, nor on the head, like ruminating animals. His cry, when hurt, approaches as near to the neighing of the horse, as the

[1] *Hippopotamus amphibius*, Lin. The genus *Hippopotamus* has four upper and four lower incisors; two upper and two lower canines; fourteen upper and fourteen lower molars. Lower canines much developed, forming strong tusks curved upwards; hard, thick, and square; muzzle very large and gibbous; body very thick and heavy; legs short, with four toes on the feet; eyes and ears small; tail short; two ventral mammæ skin very thick, almost without hair.

bellowing of the buffalo; but his usual voice resembles the neighing of a horse, from which, however, he differs in every other respect; and this fact, we may presume, has been the sole reason for giving him the name of *hippopotamus* or *river horse*, as the howling of the lynx, which resembles that of the wolf, has occasioned him to be called the *stag-like wolf*. The incisive teeth of the hippopotamus, and especially the two canine teeth of the lower jaw, are very long, very strong, and of so hard a substance, that they strike fire with a piece of iron. This is probably what has given rise to the fable of the ancients, who have reported that the hippopotamus vomited fire. These canine teeth of this animal are white, so clear and so hard that they are preferable to ivory, for making artificial teeth. The molars are square, or rather longer on one side than the other, nearly like the grinders of a man, and so thick, that a single one weighs more than three pounds. The largest of the incisive, or the canine teeth, are twelve, and even sixteen inches in length, and sometimes weigh twelve or thirteen pounds each. The skin is in some parts two inches thick; and the Africans cut it into whip thongs, which, in consequence of their softness and pliability, they prefer to those procured from the rhinoceros's hide.

The male hippopotamus is about six feet nine inches long, from the extremity of the muzzle to the beginning of the tail; fifteen feet in circumference, and six feet and a half in height. His legs are about two feet ten inches long; the length of the head three feet and a half, and eight feet and a half in circumference; and the width of the mouth, two feet four inches. It, however, sometimes acquires much greater magnitude. In the south of Africa, M. le Vaillant killed one which measured ten feet seven inches in length, and about nine feet in circumference.

Thus powerfully armed, with a prodigious strength of body, he might render himself formidable to every animal; but he is naturally gentle, and appears never to be the aggressor, except when annoyed or wounded. It has been erroneously stated, that he commonly moves slowly on the land, but, on the contrary, when he has been injured, he has been known to pursue persons for several hours, who escaped with great difficulty. He swims quicker than he runs, pursues the fish, and makes them his prey. Three or four of them are often seen at the bottom of a river, near some cataract forming a kind of line, and seizing upon such fish as are forced down by the violence of the stream. He delights much in the water, and stays there as willingly as upon land; notwithstanding which, he has no membranes between his toes, like the beaver and otter; and it is plain, that the great ease with which he swims, is only owing to the great capacity of his body, which only makes bulk for bulk, and is nearly of an equal weight with the water. Besides, he remains a long time under water, and walks at the bottom as well as he does in the open air. When he quits it to graze upon land, he eats sugar-canes, rushes, millet, rice, roots, &c., of which he consumes and destroys a great quantity, and does much injury to cultivated lands; but, as

he is more timid upon earth than in the water, he is very easily driven away; and, as his legs are short, he cannot save himself well by flight, if he is far from any water. His resource, when he finds himself in danger, is to plunge himself into the water, and go a great distance before he reappears. He commonly retreats from his pursuers; but if he is wounded, he becomes irritated, and immediately facing about with great fury, rushes against the boats, seizes them with his teeth, often tears pieces out of them, and sometimes sinks them under water. "I have seen," says a traveller, "an hippopotamus open his mouth, fix one tooth on the side of a boat and another to the second plank under the keel; that is, four feet distant from each other, pierce the side through and through, and in this manner sink the boat to the bottom. I have seen another lying by the side of the sea-shore, upon which the waves had driven a shallop heavily laden, which remained upon his back dry, and which was again washed back by another wave, without the animal appearing to have received the least injury. When the negroes go a fishing in their canoes, and meet with an hippopotamus, they throw fish to him; and then he passes on, without disturbing their fishery any more. He injures most when he can rest himself against the earth; but when he floats in the water, he can only bite. Once, when our shallop was near shore, I saw one of them get underneath it, lift it above water upon his back, and overset it with six men who were in it; but fortunately they received no hurt."

"We dare not," says another traveller, "irritate the hippopotamus in the water, since an adventure happened, which was near proving fatal to three men. They were going in a small canoe, to kill one in a river where there was about eight or ten feet water. After they had discovered him walking at the bottom, according to his custom, they wounded him with a long lance, which so greatly enraged him, that he rose immediately to the surface of the water, regarded them with a terrible look, opened his mouth, and, at one bite, took a great piece out of the side of the canoe, and had very nearly overturned it; but he replunged, almost directly, to the bottom of the water."

These animals are only numerous in some parts of the world; it even appears, that the species is confined to particular climates, and seldom to be met with, but in the rivers of Africa. Dutch travellers say that they bear three or four young ones; but this appears very suspicious, as the hippopotamus is of an enormous bulk; he is in the class of the elephant, the rhinoceros, the whale, and all other great animals, who bring forth but one; and this analogy appears more certain than all the testimonies that they have exhibited. The female brings forth her young upon land, and the calf, at the instant when it comes into the world, will fly to the water for shelter if pursued; a circumstance which Thunberg notices as a remarkable instance of pure instinct. Major Denham furnishes us with the following amusing account:—

"It was intended this evening to have killed an hippopotamus, an animal

which exists in great numbers in the lake, on the border of which we were encamped; but a violent thunder storm, to our great disappointment, prevented our witnessing so novel a species of sport. The flesh is considered a great delicacy. On the morrow we had a full opportunity of convincing ourselves that these uncouth and stupendous animals are very sensibly attracted by musical sounds, even though they should not be of the softest

kind; as we passed along the borders of Lake Muggaby at sunrise, they followed the drums of the different chiefs the whole length of the water, sometimes approaching so close to the shore, that the water they spouted from their mouths reached the persons who were passing along the banks. I counted fifteen at one time sporting on the surface; and my servant Columbus shot one of them in the head, when he gave so loud a roar, as he buried himself in the lake, that all the others disappeared in an instant."

The preceding cut is copied from Thompson's Travels in Southern Africa, from which we make the following extract. "The hippopotami are numerous in many parts of this river, (the Gariep,) and are occasionally caught by the natives, by means of huge pitfalls dug in the paths frequented by them when they issue from the floods, to browse on the wooded banks. The capture of one of those enormous animals must be an event of rejoicing to a whole horde of half starved Bushmen or Koranas, sufficient to banish hunger and heaviness for months to come. The hippopotamus, though timid on shore, is sometimes a dangerous antagonist in the water. Mr Moffat informed me, that once when he was passing Read's Drift, a Hottentot of his party was bit in two by one of these monstrous animals."

It appears from the accounts of travellers, that the numbers of this animal are very great in nearly all the lakes and rivers of Africa, from the Cape of Good Hope to 15° north latitude.

THE HOG[1]

Of all quadrupeds, the hog appears the most rough and unpolished. His voraciousness apparently depends on the continual necessity which he has to fill the vast capaciousness of his stomach. It is the roughness of the hair, the hardness of the skin, and the thickness of the fat, which render these animals so insensible to blows. Mice have been known to lodge in their backs, and eat their fat and their skin, without their seeming sensible of it. Their other senses are good; and the huntsmen know that wild boars both see, hear, and smell, at a great distance; since, in order to surprise them, they wait in silence during the night, and place themselves under the wind, to prevent the boars perceiving their smell, of which they are sensible at a great distance, and which always immediately makes them change their road.

Their imperfection in the sense of touch is still more augmented by a distemper which is called the measles, and which renders them almost absolutely insensible. This disorder proceeds in general from the coarseness of their food; for the wild boar, which usually lives on corn, fruits, acorns, and roots, is not subject to this distemper, any more than the young pig whilst it sucks. This is only to be prevented by keeping the domestic hog in a clean stable, and giving him plenty of wholesome food; by this means his flesh will become excellent to the taste, and the lard firm and brittle, especially, if he be kept for a fortnight or three weeks before he is killed, in a clean stable, without litter, giving him no other food than dry corn; for this purpose we should choose a swine of about a year old, full of flesh and fat.

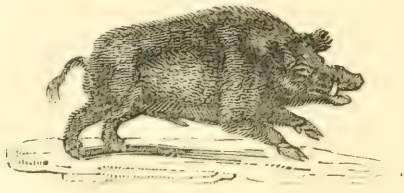
Voracious and uncleanly as he is, the hog has some good qualities. If one of his own kind utters a cry of distress, every hog within hearing instantly hurries to his assistance. When teased by a dog, they have been known to hem him round, and kill him. If a male and female are brought up together when young, and the latter loses her companion, she begins immediately to decline, and probably dies of a broken heart.

Nor is the hog wholly useless while living. In Minorca, he is frequently yoked to the plough in conjunction with an ass, and he performs his task in a workmanlike manner. In some parts of Italy and France, swine are used to discover truffles, which grow a few inches under the surface of the soil. A cord is tied round the animal's hind leg, he is conveyed to the field, and wherever he stops to root with his nose, there the truffle is invariably

[1] *Sus scrofa*, Lin. The genus *Sus* has four or six upper and six lower incisors; two upper and two lower canines; fourteen upper and fourteen lower molars. Canines bent upwards and laterally; molars tuberculous; lower incisors bent forward; four toes on all the feet, the two middle ones only touching the ground, armed with strong hoofs; nose elongated, cartilaginous; body covered with bristles; twelve teats.

found. A recent French writer on the noble science of gastronomy ludicrously denominates the hog, "the Christopher Columbus of the truffle."

That hogs are not destitute of sagacity, is proved by the long succession of learned pigs which, for so many years, have been trained to astonish the multitude at fairs, and other places, where numbers of persons are congregated.



The wild boar is hunted by dogs, or else taken by surprise in the night by the light of the moon. As he runs but slowly, leaves a strong odor behind him, defends himself against the dogs, and wounds them dangerously, so he should not be hunted by dogs designed for the stag and the goat; for this hunting spoils their scent, and teaches them to go slowly. The oldest only should be attacked, and these are easily known by their traces; a young wild boar, of three years old, is difficult to take, because he runs a great way without stopping; instead of which, a wild boar that is older does not run far, suffers himself to be closely hunted, and has no great fear of the dogs. In the day, he usually hides himself in the thickest and most unfrequented part of the wood; and in the evening, and at night, he goes out to seek for food. In summer, when the corn is ripe, it is easy to surprise him; but mostly so among oats, where he frequents every night. As soon as he is killed, the hunters immediately cut out the testes, the smell of which is so strong, that if five or six hours were to elapse without cutting them out, all the flesh would be infected; and in an old wild boar the head only is good to eat; instead of which, the flesh of the young wild boar is extremely delicate.

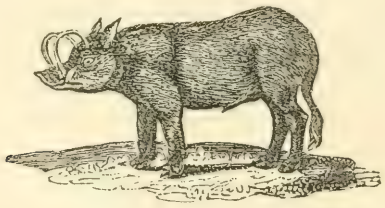
No person that has lived in the country ever so little, is ignorant of the profits arising from the hog; his flesh sells for more than that of the ox; the lard is valuable; the blood, the bowels, the viscera, the feet, and the tongue, when properly prepared, are all fit to eat. The dung of the hog is much colder than that of other animals, and should not be used for any but hot and dry lands. The skin has its use, for saddles are made of it; and brooms, brushes, and pencil brushes are made of the hair. The flesh of this animal takes salt and saltpetre better than any other, and will keep longer salted.

This species, though abundant, and greatly spread in Europe, in Africa, and in Asia, was not, however, found on the continent of the New World. It was transported by the Spaniards, who have carried black hogs to the continent, and to almost all the large islands of America; they are multipli-

ed, and become wild in many places; and resemble European wild boars, with this difference, that the body is shorter, the head larger, and the skin thicker; and domestic hogs, in warm climates, are all black like wild boars.

The fecundity of the hog is very great; instances are known of individuals producing three hundred and twenty-five young in twenty litters, and two hundred and five in twelve litters. The English variety of the hog sometimes weighs twelve hundred pounds. There are many other varieties.

THE BABIROUSSA, OR INDIAN HOG.[1]



All naturalists have regarded this animal as a kind of hog, though it has neither the head, shape, bristles, nor tail of a hog. Its legs are longer and its muzzle shorter. It is covered with soft and short hair like wool; and its tail, which tapers to a fine point, is terminated by a tuft of the same; its body is likewise not so thick and clumsy as that of the hog; its ears are short and pointed; its skin is black, and furrowed with wrinkles and creases; but the most remarkable character, and what distinguishes it from all other animals, are four enormous tusks, or canine teeth; the teeth, the two shortest of which shoot out of the lower jaw, like those of the boar; the two others, which come from the upper jaw, pierce the cheeks, or rather the upper part of the lips, and rise crooked almost to the eyes. These tusks are of a very beautiful ivory, much smoother and finer, but not so hard as that of the elephant.

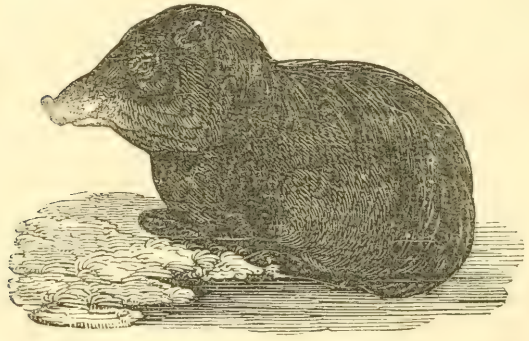
These quadruple and enormous tusks give these animals a very formidable appearance; they are, however, less dangerous than our wild boars. They go, like them, in herds; they have a very strong smell, by which they are easily discovered, and hunted with good success. They grunt terribly, defend themselves, and wound their enemy with their under tusks; for the upper are rather of disservice than of use to them. Although wild and ferocious as the boar, they are tamed with much ease; but their flesh, which is very good food, putrefies in a very short time. As their hair is fine, and their skin delicate, it is soon penetrated by the teeth of the dogs, who hunt

[1] *Sus babyrussa*, Lin.

them in preference to wild boars, and sooner accomplish their purpose. The babiroussa strikes its upper tusks into the branches of trees, to rest its head, or to sleep standing. This habit it has in common with the elephant, who, in order to sleep in an erect posture, supports his head by fixing the end of his tusks in the holes which he makes in his lodging.

The babiroussa differs still more from the wild boar by its natural appetites. It feeds upon grass and leaves of trees, and does not endeavor to enter gardens, to feed on beans, peas, and other vegetables: while the wild boar, who lives in the same country, feeds upon wild fruits, roots, and often on the depredations it makes in gardens. These animals, who go alike in herds, never mix; the wild boars keep on one side, and the babiroussas on the other; these walk quicker, and have a very fine scent. They often fix themselves against a tree, to keep off the hunters and their dogs. When they are pursued for a long time, they make towards the sea, and, swimming with great dexterity, very often escape their pursuers; for they swim for a very long time, and often to very great distances, and from one island to another. The babiroussa is found not only in the island of Bourou, near Amboyna, but also in many parts of Southern Asia and Africa.

THE PECCARY, OR MEXICAN HOG,[1]



Differs from the common hog in a number of characteristics, both external and internal. Its head is shorter and broader; it has only four incisor teeth in the upper jaw, instead of six; it has only three instead of six toes on the hind feet; its legs are slenderer; in the stomach and intestines there

[1] *Dicotyles torquatus*, Lin. The genus *Dicotyles* has four upper and six lower incisors; two upper and two lower canines; twelve upper and twelve lower molars; tusks not projecting from the mouth, the other teeth like those of the hog; four toes before, three behind, only two of which lean upon the ground; a glandular opening on the back, from which exudes a fœtid humor; no tail.

is a difference of conformation; the tail is extremely short, remarkably flat, and completely pendulous; and its bristles are much stronger than those of the wild boar; and, lastly, it has, upon that part of the back which borders upon the buttocks, an opening from which there is discharged an ichorous humor of a very disagreeable smell. The peccary is the only animal which has an opening in this region of the body. In the civets, the badger, and the genet, the reservoir for the perfume is situated beneath the parts of generation; and in the musk animals we find it under the belly.

The peccary may be rendered a domestic animal, like the hog, and has pretty nearly the same habits and natural inclinations. It feeds upon the same aliments; and its flesh, though more dry and lean than that of a hog, is not unpalatable. The female, however, breeds only once a year, and has but two young ones at a birth.

These animals are extremely numerous in all the parts of South America There are two species;

THE COLLARED PECCARY,[1] AND THE WHITE-LIPPED PECCARY.[2]

The former is not a migratory animal, but usually lives in the forest where it is produced, and is generally met with in pairs or in small families. It is the smallest of the two species, seldom measuring three feet in length, or weighing more than fifty pounds. Its general color is a yellowish gray, with the exception of the legs, which are nearly black; and it has a somewhat erectile mane on the back of the neck, composed of a row of long black bristles.

The white-lipped peccary is much larger than the other species, as it not unfrequently reaches a length of three feet and a half, and a weight of a hundred pounds. It is thicker and stouter in its proportions, has a longer and thicker mane, and has less of the grayish tinge. "Unlike the former species, the white-lipped peccaries," says the author of The Gardens and Menagerie of the Zoological Society, "congregate in numerous bands, sometimes amounting, it is said, to more than a thousand individuals of all ages. Thus united, they frequently traverse extensive districts, the whole troop occupying an extent of a league in length, and directed in their march, if the accounts of the natives are to be credited, by a leader, who takes his station at the head of the foremost rank. Should they be impeded in their progress by a river, the chief stops for a moment, and then plunges boldly into the stream, and is followed by all the rest of the troop. The breadth of the river or the rapidity of the current appear to be but trifling obstacles in their way, and to be overcome with the greatest facility. On reaching the opposite bank, they proceed directly on their course, and continue their march even through the plantations which, unfortunately for the owners,

[1] *Dicotyles torquatus*, Cuv. [2] *Dicotyles labiatus*, Cuv.

may happen to lie in their way; and which they sometimes completely devastate by rooting in the ground for their favorite food, or devouring such fruits as they find there. If they meet with any thing unusual on their way, they make a terrific clattering with their teeth, and stop and examine the object of their alarm. When they have ascertained that there is no danger, they continue their route without further delay; but if a huntsman should venture to attack them when they are thus assembled in large numbers, he is sure to be surrounded by multitudes and torn to pieces by their tusks, if he is so unwise as to neglect his only chance of escape, which consists in climbing a tree, and thus getting fairly out of their reach. The smaller bands are by no means equally courageous, and always take to flight at the first attack.

"M. Sonnini relates that he was often, in the course of his travels in Guiana, surrounded by a troop of peccaries infuriated with the havoc made by the muskets of himself and his companions. Mounted upon a tree, he was enabled to observe their motions, and to notice the manner in which they encouraged, by their grunts and by the rubbing of their snouts together, those among them who were injured by the shots which were poured on them from above. With erected bristles, and eyes sparkling with rage, they still maintained their ground; and it was sometimes only after two or three hours' incessant firing that they were at last compelled to quit the field of battle, and to leave the bodies of the dead to the mercy of the conquerors. These days of victory over the peccaries, he adds, are always days of abundance for the traveller in those immense forests, who has no other resource except the chase. An enormous gridiron is immediately constructed with sticks fixed in the earth, and three feet in height, over which a quantity of small branches are placed in a transverse direction. On these the peccaries are deposited, after being cut in pieces, and are cooked by a slow fire, which is kept up during the whole night."

In its native country, the peccary is rather fond of the mountainous parts, than of the low and level grounds; it seems to delight neither in the marshes nor the mud, like our hogs; it keeps among the woods, where it subsists upon wild fruits, roots, and vegetables; it is also an unceasing enemy to the lizard, the toad, and all the serpent kinds with which the uncultivated forests of the New Continent abound. As soon as it perceives a serpent or a viper, it at once seizes it with its fore hoofs and teeth, skins it in an instant, and devours the flesh. They commit great havoc among the sugar-canes, maize, manihot, and potato crops.

The young ones follow the dam, and do not separate from her till they have come to perfection. If taken at first, they are very easily tamed, and soon lose all their natural ferocity; they, however, never display any remarkable signs of docility. They only continue to do no mischief; and they may be permitted to run tame, without apprehending any dangerous consequences. They seldom stray far from home; they return of themselves to

the sty, and do not quarrel among each other, except when they happen to be fed in common. When enraged, they draw their breath with great force, and their bristles point upward; nor, on such occasions, can these be said so much to resemble the bristles of the wild boar as the sharp armor of the hedgehog.

Captain Waterton, who made several excursions into the forests of Guiana, tells us that the Macoushi Indians are accustomed to kill birds and other game, with arrows dipped in poison called *wourali*. This is made from a plant of that name, mixed with several other ingredients, and prepared with magical ceremonies and incantations. A large portion of the food of the natives consists of peccaries slain by the poisoned arrows. The bow is commonly used, and the animal seldom runs two hundred paces after being struck before he dies by the effect of the subtle poison. It is remarkable that the flesh of creatures killed in this manner, is perfectly wholesome. Besides the bow, the Indians often use a tube made of a reed eleven or twelve feet in length, through which the arrow is sent by the breath with great precision and considerable force. Birds are generally killed in this way, and sometimes larger animals.

THE RHINOCEROS.[1]

After the elephant, the rhinoceros is the most powerful of all quadrupeds. He is at least twelve feet in length, from the extremity of the snout to the

[1] Rhinoceros of India, *Rhinoceros Indicus*, Sumatra Rhinoceros, *Rhinoceros Sondaicus*, and Rhinoceros *Sumatrensis*, (two species.) Two horned Rhinoceros, *Rhinoceros Africanus* and *Rhinoceros Camus*, (two species.) The genus *Rhinoceros* has sometimes none, sometimes two, and sometimes four upper and the same number of lower incisors; no canines; twelve or fourteen upper and the same number of lower molars. Incisors unequal among themselves when they exist; anterior molars small, the posterior increasing progressively; eyes small, lateral; ears long, narrow; three toes on all the feet; one or two horns placed on the nose, above the nasal cavity; skin very thick, naked and rugous; tail short, laterally compressed.

tail; six or seven feet in height; and the circumference of his body is very nearly equal to his length; he is therefore like the elephant in bulk; and if he appears much smaller, it is because his legs are much shorter in proportion to those of the elephant; but he differs widely from that sagacious animal, in his natural faculties, and his intelligence; having received from nature merely what she grants in common to all animals, deprived of all feeling in the skin, having no organ answering the purpose of hands, nor distinct for the sense of feeling, he has nothing instead of a trunk, but a moveable upper lip, in which centres all his dexterity. He is superior to other animals only in strength, size, and the offensive weapon which he carries upon his nose, and which is peculiar to him. This weapon is a very hard horn, solid throughout, and placed more advantageously than the horns of ruminating animals; these only protect the superior parts of the head and neck, whilst the horn of the rhinoceros defends all the exterior parts of the snout, and preserves the muzzle, the mouth, and the face from insult; so that the tiger attacks more readily the elephant, in seizing his trunk, than the rhinoceros, which he cannot attack in front, without running the danger of being killed; for the body and limbs are covered with an impenetrable skin; and this animal fears neither the claws of the tiger nor the lion, nor even the fire and weapons of the huntsman; his skin is a dark leather, of the same color, but thicker and harder than that of the elephant; he does not feel the sting of flies; he cannot contract his skin; it is only folded by large wrinkles on the neck, the shoulders, and the buttocks, to facilitate the motions of the legs, which are massive, and terminate in large feet, armed with three great claws. The skin of the two horned rhinoceros is much more easily penetrable than that of the single horned. It not only appears that the skin is thinner than that of the one horned rhinoceros, but it seems that it has not the same folds. Mr Burchell says that there are two distinct species of the two horned rhinoceros in South Africa. He has the head larger in proportion than the elephant; but the eye still smaller, which he never opens entirely, and they are so situated that the animal can see only what is in a direct line before him. The upper jaw projects above the lower; and the upper lip has a motion, and may be lengthened six or seven inches; it is terminated by a sharp edge, which enables this animal, with more facility than other quadrupeds, to gather branches and grass, and divide them into handfuls, as the elephant does with his trunk. This muscular and flexible lip is a sort of trunk very incomplete, but which is equally calculated for strength and dexterity. Instead of those long ivory teeth which form the tusks of the elephant, the rhinoceros has his powerful horn, and two strong incisive teeth in each jaw. These incisive teeth, which the elephant has not, are placed at a great distance from each other in the jaws of the rhinoceros. He has, besides these, twenty-four smaller teeth, six on each side of each jaw. His ears are always erect; they are, for the form like those of a hog, only they are larger in proportion to his

body; they are the only hairy parts of it. The end of the tail is, like that of the elephant, furnished with a tuft of large bristles, very hard and very solid. Huge and seemingly unwieldy as the rhinoceros is, he has the power of running with very great swiftness.

The rhinoceros which arrived in London in 1739, had been sent from Bengal. Although he was young, (being but two years old,) the expenses of his food, and his voyage, amounted to near one thousand pounds sterling; he was fed with rice, sugar, and hay. They gave him daily seven pounds of rice, mixed with three pounds of sugar; which they divided into three parts. He had, also, a great quantity of hay and green grass, to which he gave the preference. His drink was nothing but water, of which he drank a great quantity at once. He was of a quiet disposition, and let his manager touch him on all the parts of his body. He grew unruly when he was struck, or was hungry; and in both cases he could not be appeased without giving him something to eat. When he was angry, he leaped forward with impetuosity to a great height, beating furiously the walls with his head; which he did with a prodigious quickness, notwithstanding his heavy appearance.

This rhinoceros, when he was two years old, was not much higher than a young cow who has not yet borne young; but his body was very long and very thick. The tongue of this young rhinoceros was soft, like that of a calf; his eyes had no vivacity; they are like those of a hog in form, and were placed very low; that is, nearer the opening of the nostrils.

Mr Parsons says, that he has observed a very particular quality in this animal; he hearkened with a sort of continual attention to any noise; so that, if he even was sleepy, employed in eating, or in satisfying other urgent wants, he started instantly, raised up his head, and gave attention till the noise had ceased.

It is certain that some rhinoceroses have but one horn on the nose, and others two. In the two-horned rhinoceros, one of the horns is smaller than the other, and is situated above it. When the animal is quiescent these horns are loose, but they become fixed when it is irritated. There are single horns of three feet and a half, and perhaps of more than four feet in length, by six or seven inches in diameter at the base; there are also double horns which are but two feet in length. Commonly, these horns are brown, or olive color; yet some are gray and even white. They have only a small concavity, in form of a cup, at their basis, by which they are fastened to the skin of the nose; the remaining part of the horn is solid, and very hard. It is with this weapon that the rhinoceros is said to attack, and sometimes to wound mortally the largest elephants, whose long legs give the rhinoceros who has them much shorter, an opportunity of striking them with his horn under the belly, where the skin is tender, and more penetrable; but if he misses the first blow, the elephant throws him on the ground, and kills him. The horn of the rhinoceros is more valued by the Indians, than the ivory

of the elephant; not so much on account of the matter, of which they make several works with the chisel, but for its substance, to which they attribute divers virtues, and medicinal properties. The white ones, as the most rare, are also those which they value most. Cups made of this horn are used to drink out of by many of the Indian princes, under the erroneous idea that when any poisonous fluid is put into them, the liquor will ferment and run over the top.

The rhinoceros, without being ferocious or carnivorous, or even very wild, is nevertheless untamable. He is of the nature of a hog, blunt and grunting, without intellect, without sentiment, and without tractableness. These animals are also, like the hog, very much inclined to wallow in the mire; they like damp and marshy places, and seldom leave the banks of rivers. They are found in Asia, and Africa, in Bengal, Siam, Laos, in the Mogul dominions, in Sumatra, in Java, in Abyssinia, and about the Cape of Good Hope. The two-horned rhinoceros is only found in Africa. But, in general, the species is not so numerous, or so universally spread, as that of the elephant. The female brings forth but one young, and at a great distance of time. In the first month the rhinoceros is not much bigger than a large dog; he has not, when first brought forth, the horn on the nose, although the rudiment of it is seen in the fœtus. When he is two years old, this horn is only an inch long; and in his sixth year it is about ten inches. And as some of these horns have been seen very near four feet long, it seems they grow till his middle age, and perhaps during the whole life of the animal, which must be long, since the rhinoceros described by Mr Parsons was not come to half his growth when he was two years old; which makes it probable, that this animal lives, like a man, seventy or eighty years.

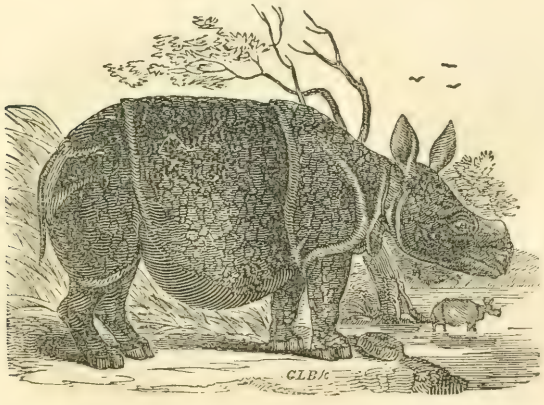
Without being useful, as the elephant, the rhinoceros is very hurtful, by the prodigious devastation which he makes in the fields. The skin is the most valuable part of this animal. His flesh is excellent, according to the taste of Indians and negroes. Kolben says, he has often eaten it with great pleasure. His skin makes the best and hardest leather in the world; and not only his horn, but all the other parts of his body, and even his blood, his urine, and his excrements, are esteemed as antidotes against poison, or a remedy against several diseases; probably, however, all those virtues are imaginary.

The rhinoceros feeds upon herbs, thistles, prickles, and shrubs; and he prefers this wild food to the sweet pasture of the verdant meadows: he is very fond of sugar-canes, and eats all sorts of corn. Having no taste whatever for flesh, he does not molest small animals, neither fears the large ones, living generally in peace with them all, even with the tiger, who often accompanies him, without daring to attack him.

The rhinoceroses do not herd together, nor march in troops, like the elephant; they are wilder, and more solitary, and perhaps more difficult

to be hunted and subdued. They never attack men unless provoked; but then they become furious, and are very formidable. The steel of Damascus, the cimeters of Japan, cannot make an incision in his skin; the darts and lances cannot pierce him through. His skin even resists the balls of a musket; those of lead become flat upon his leather, and the iron ingots cannot penetrate through it. The only places absolutely penetrable in this body, armed with a cuirass, are the belly, the eyes, and round the ears; so that huntsmen, instead of attacking this animal standing, follow him at a distance by his track, and wait to approach him at the time that he sleeps or rests himself. There is, in the king of France's cabinet, the fœtus of a rhinoceros, which was sent from the island of Java, and extracted from the body of the mother. It was said, in a memorial which accompanied this present, that twenty-eight huntsmen had assembled to attack this rhinoceros. They had followed her far off for some days, one or two men walking now and then before, to reconnoitre the position of the animal. By these means, they surprised her when she was asleep, and came so near in silence, that they discharged, all at once, their twenty-eight guns into the lower parts of her belly.

A rhinoceros, about a year old, recently brought from Calcutta, was lately exhibited in Boston. The engraving furnishes a very exact representation of this animal. Its length, from the nose to the insertion of the tail,

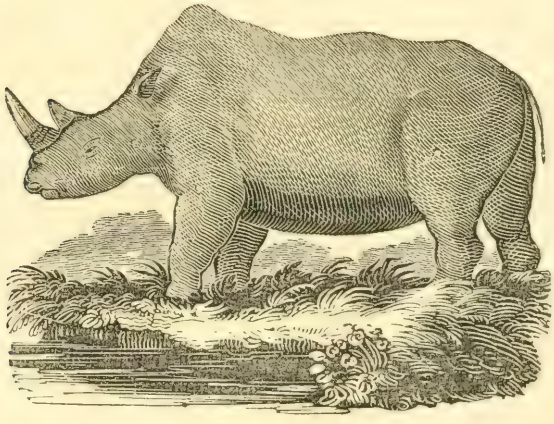


was six feet; its height, three feet four inches. The length of its head, eighteen inches; that of its tail, thirteen inches. The horn had not made its appearance upon the nose, but there was a large protuberance, which indicated the place where it was growing, and seemed to form the root or basis of it. The animal, when disturbed, made a noise like a young calf. It had very much the air and manners of a hog. It betrayed no fear

or shyness, but seemed constantly intent upon getting something to eat. It fed upon hay, potatoes, and grain, and so greedy was its appetite, that nothing came amiss. Another recently arrived at Boston, and died in the harbor. It was about a third larger than the one above mentioned. Its skeleton, beautifully prepared, is now in the Cabinet of the Boston Society of Natural History.

We have seen that this animal has a good ear; it is also affirmed, that he has the sense of smelling in perfection; but it is pretended he has not a good eye, and sees only before him. His eyes are so small, and placed so low, and so obliquely, they have so little vivacity and motion, that this fact needs no other confirmation. His voice, when he is calm, resembles the grunting of a hog; and when he is angry, his sharp cries are heard at a great distance. Though he lives upon vegetables, he does not ruminate; thus, it is probable, that, like the elephant, he has but one stomach, and very large bowels, which supply the office of the paunch. His consumption, though very great, is not comparable to that of the elephant; and it appears, by the thickness of his skin, that he loses less than the elephant his perspiration.

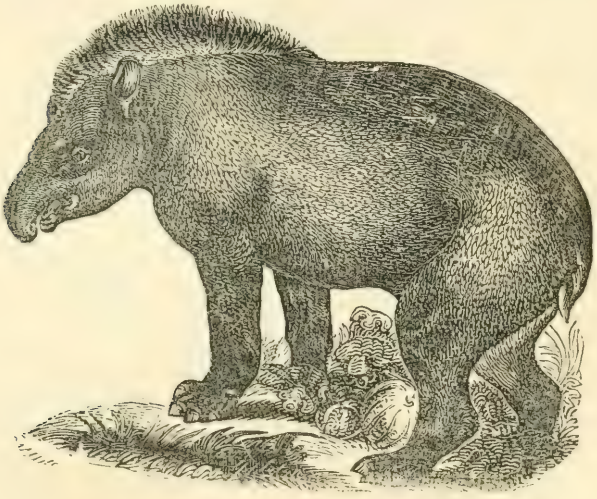
Two species of the two horned rhinoceros are found in South Africa. The following figure was drawn from life, by Mr Melville, and conveys an accurate representation of the species, which abounds most in the Bechuana



country. The horn of the female is, however, much longer and more slender than that of the male, being three and a half feet long. Being a strong, ponderous, and elastic substance, it is much prized by the natives, for handles to their battle-axes. The secondary horn is, in many instances, so small as to be scarcely perceptible at a little distance.

THE TAPIR, OR THE ANTA.[1]

The tapir is of the size of a small cow, but without horns, and with a short, naked tail; the legs are short and thick, and the feet have small black hoofs. The body is thick and clumsy, and the back somewhat arched, and the hair is of a dusky or brownish color. On the short thick neck is a kind of bristly mane, which, near the head, is an inch and a half in length. His head is of a tolerable size, with roundish erect ears, and small



eyes, and the muzzle terminates in a kind of proboscis, which can be extended or contracted, at the will of the animal. The latter it uses in feeding, to grasp its food and convey it to the mouth, in the same way that the rhinoceros applies its upper lip; and in this are also contained the organs of smell. He has ten incisive teeth, and ten grinders, in each jaw; a character which separates him entirely from the ox, and other ruminating animals. His skin is so thick and hard as to be almost impenetrable to a bullet; for which reason the Indians make shields of it.

The tapir seldom stirs out but in the night, and delights in the water, where he oftener lives than upon land. He is chiefly to be found in marshes,

[1] *Tapirus Americanus.* The genus *Tapirus* has six upper and six lower incisors; two upper and two lower canines; fourteen upper and fourteen lower molars. Intermediate incisors shorter than the exterior; nose terminating in a moveable little proboscis, but not by a kind of finger, like the elephant; eyes small; ears long and moveable; fore feet with four toes, the hind ones with three, with short, round hoofs; tail very short; two inguinal mammæ.

and seldom goes far from the borders of rivers or lakes. He swims and dives with singular facility. When he is threatened, pursued, or wounded, he plunges into the water, and remains there till he has got to a great distance, before he re-appears. These customs, which he has in common with the hippopotamus, have made some naturalists imagine him to be of the same species; but he differs as much from him in nature, as he is distant from him in climate. To be assured of this, there needs no more than to compare the description we have now recited, with that of the hippopotamus. Although the tapir inhabits the water, he does not feed upon fish; and, although his mouth is armed with twenty sharp incisive teeth, he is not carnivorous. He lives upon sugar-canes, grasses, the leaves of shrubs, and various kinds of fruit; and does not make use of what nature has armed him with against other animals. He is of a mild and timid nature, and flies from every attack or danger: when, however, he is cut off from retreat, he makes a vigorous defence against dogs and men. His usual attitude is that of sitting on his rump like a dog; and his voice is a kind of whistle. The flesh is wholesome food. He may be tamed, and is then very gentle and docile. This animal is commonly found in Brazil, Paraguay, Guiana, and in all the extent of South America, from the extremity of Chili to Columbia.

A species of tapir, which has recently been discovered, is very common in the island of Sumatra and the forests of Malacca. Its body is of a dirty white, while the head, legs, and tail are of a deep black. This species has no mane, and its proboscis is from seven to eight inches long.

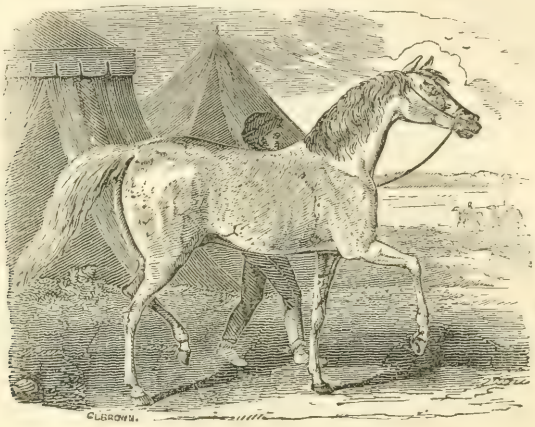
Among the numerous fossil remains of a former world, are found fragments of tapirs of enormous size. One of these extinct species, the gigantic tapir, must have been more than equal to the elephant in magnitude.

THE HORSE.[1]

The horse is not known in its pristine state. The natural disposition of these animals is not ferocious, they are only high spirited and wild; and though superior in strength to the greatest part of animals, yet they never attack them; and if they are attacked by others, either disdain them or trample them under their feet. They go also in bodies, and unite themselves into troops, merely for the pleasure of being together; for they are

[1] *Equus caballus*, Lin. The genus *Equus* has six upper and six lower incisors; two upper and two lower canines, or sometimes none in the females; twelve upper and twelve lower molars. Molars furrowed on each side, with flat crowns and several ridges of enamel; a void space between the canines and molars; upper lip capable of considerable motion; eyes large; ears rather large, pointed, erect, and moveable; feet terminating in a solid hoof; tail with long hair, or a tuft at its extremity; two inguinal mammæ.

not fearful of, but have an attachment to, each other. As herbs and vegetables are sufficient for their nourishment, they have quite enough to satisfy their appetite; and as they have no relish for the flesh of animals, they never make war with them, nor with each other. They never quarrel about their food, they have no occasion to ravish the prey of another, the ordinary source of contentions and quarrels.



The astonishment and fear which the inhabitants of Mexico and Peru expressed at the sight of horses and their riders, convinced the Spaniards that this animal was entirely unknown in those countries. They therefore carried thither a great number, as well for service and their particular utility, as to propagate the breed. M. de la Salle, in 1685, saw in the northern parts of America, near the bay of St. Louis, whole troops of these wild horses, feeding in the pastures, which were so fierce that no one dared to approach them. The author of the History of the Adventures of the Buccaneers, says, that, in the island of St Domingo, horses may sometimes be seen in troops of upwards of five hundred, all running together; and that as soon as they see a man, they will all stop. That one of them will approach to a certain distance, snort, take flight, and then all the rest will follow him. To catch them, they make use of nooses made of ropes, which they spread and hang in places which they know they frequent. But if they are caught by the neck they strangle themselves, unless the hunter comes in time to their assistance, who instantly secures them by the body and legs, and fastens them to trees, where they are left for two days without either food or drink. This experiment is sufficient to begin to make them tractable, and in time they become as much so as if they had never been wild. And even if by chance they ever regain their liberty, they never become so again, but know their masters, and suffer them to catch them again without trouble.

Of those which have returned to the wild state, such as the numerous herds of South America, the appearance is not prepossessing, according to the ideas which have been formed of the symmetry of the domestic varieties.

The different races of the horse are numerous, most of the principal countries in the world possessing breeds peculiar to themselves. But the Arabian race has long been considered as the noblest of the species, and as combining the qualities of endurance, vigor, and temper, in a higher degree than any of the other varieties. As breeders of horses have ascertained that the qualities of the Arabian horse may be perpetuated in his descendants, in the countries of Europe, where attention is paid to the raising of this valuable animal, for various purposes, the deterioration which a northern climate induces in a native of warmer latitudes, is counteracted by crossing with the original breed. From the importation of the pure breed of Arabia into Europe, and the different crossings of these and their descendants with the native breeds, has arisen all that variety of appearance and qualities of the horse, which fits them for heavy draughts, the plough, or the saddle.

It is in England chiefly, however, that the cultivation and education of the horse has been carried to its greatest refinement, and in France are local races, admirably adapted to the different purposes which agriculture, or commerce, or luxury may demand. The first is the race horse, immediately proceeding from an Arabian or Barbary stallion, with an English mare already crossed with a Barb or Arab, in the first degree, or the result of two crossings in the same degree. This breed is termed first blood, or the nearest possible to the original stock; and in the quality of speed it is not probable that it can ever be exceeded. The next is the hunter, the result of crossing a stallion of the first blood with a mare of a degree less near the original source. The third, is the cross between the hunter and the more common mares, which, uniting the stronger limbs and heavier bodies of the indigenous races to the qualities of the Arabian, produce the British carriage horses; and the great dray horse, whose gigantic proportions and immense power of draught can scarcely be surpassed, are the produce of this last with the strongest mares of the country breed. And it is a curious circumstance, that, in the mixture of all these races, the influence of the Arab blood is observable, either in the conformation of some peculiar parts, or the preservation of some peculiar qualities. The Persian, Barbary, and Turkish horses are those which come nearest to the Arabian in conformation and qualities, and the Spanish horses long enjoyed a high character in Europe, probably from the breed being kept up by the intermixture of the horses of Barbary. In France are numerous varieties, and most of them very serviceable animals. The other European races, it would be impossible to enumerate here.

The Arabs divide their horses into two races. The first, which they call *kochlani*, or *kailhan*, are those whose genealogy is known for two thousand years, and which has, they say, originated from the stud of Solomon. The other race, appropriated to servile uses, they name *kadischi*, or horses of an unknown race, and they are peculiarly careful, by certificates and other means, to preserve the principal races pure. The mares enjoy the exclusive privilege of transmitting the purity of the race to their descendants, and the genealogies are always reckoned from the mothers.

Herds of wild horses, the offspring of those which have escaped from the Spanish possessions in Mexico, are not uncommon in the extensive prairies that lie to the west of the Mississippi. They were once numerous on the

Kootannie Lands, near the northern sources of the Columbia, on the eastern side of the Rocky Mountain ridge; but of late years, they have been almost eradicated in that quarter. They are not known to exist in a wild state, to the northward of the fifty-second or fifty-third parallel of latitude. The young stallions live in separate herds, being driven away by the old ones, and are easily ensnared, by using domestic mares as a decoy. The Kootannies are acquainted with the Spanish-American mode of taking them with the *lasso*.

THE DZHIGGTAI, OR WILD ASS,[1]

Exhibits in its natural, or wild state, an appearance very far superior, both in point of beauty and vivacity, to the horse. It is a native of Asia, living, like the rest of this genus, in a gregarious manner. It chiefly occurs in the dry and mountainous deserts of Tartary, and in the southern parts of India and Persia. It is frequently spoken of as being met with, by travellers in Africa; but the quagga, which abounds in Southern Africa, and is sometimes called the wild ass, has been no doubt confounded with this animal. The color of the wild ass is gray, or brownish yellow, with a brown dorsal stripe, and one or two bands across the shoulders.

The food of this animal consists chiefly of saline or bitter plants. It is also fond of salt or brackish water. The manners of the wild ass resemble those of the wild horse. They assemble in troops, under the conduct of a leader or sentinel, and are extremely shy and vigilant; and, like the former animals, dart off with the utmost rapidity on the sight of mankind. They have been at all times celebrated for their swiftness. Their voice resembles that of the domestic ass, but is somewhat shriller. From this animal, the domestic ass has been gradually derived.

THE ZEBRA[2]

Is, perhaps, the handsomest and most elegantly clothed of all quadrupeds. He has the shape and graces of the horse, the swiftness of the stag, and

[1] *Equus hemionus*, Desm. [2] *Equus zebra*, Lin.

a striped robe of black and white alternately disposed with so much regularity and symmetry, that it seems as if nature had made use of the rule and compass to paint it. These alternate bands of black and white are so much the more singular, as they are straight, parallel, and very exactly divided, like a striped stuff; and as they, in other parts, extend themselves not only over the body, but over the head, the thighs, the legs, and even the ears and the tail; so that, at a distance, this animal appears as if he were surrounded with little fillets, which some person had disposed, in a regular manner, over every part of the body. In the females, these bands are alternately black and white. In the male, they are brown and yellow, but always of a lively and brilliant mixture, upon a short, fine, and thick hair; the lustre of which still more increases the beauty of the colors. The zebra is, in general, less than the horse, and larger than the ass; and, although it has often been compared to those two animals, and called the *wild horse* and the *striped ass*, it is a copy neither of the one nor the other; and might rather be called their model, if all was not equally original in nature, and if every species had not an equal right to creation.

The zebra is not the animal the ancients have indicated under the name *onagra*. There exists in the Levant, the eastern parts of Asia, and in the northern parts of Africa, a beautiful race of asses, who, like the finest horses, are natives of Arabia. This race differs from the common, by the size of the body, the slenderness of the legs, and the lustre of the hair. They are of a uniform, but commonly of a fine mouse color, with a black cross upon the back and the shoulders; and sometimes they are of a bright gray color, with a flaxen cross. The zebra is also of a different climate from the onagra, and is only to be met with in the most eastern and the most southern parts of Africa, from Ethiopia to the Cape of Good Hope, and thence to Congo. It exists neither in Europe, Asia, nor America, nor even in all the northern parts of Africa. Those which some travellers tell us they have seen at the Brazils, have been transported thither from Africa; those which others are recounted to have seen in Persia, and in Turkey, have been brought from Ethiopia; and, in short, those that we have seen in Europe are almost all from the Cape of Good Hope. This point of Africa is their true climate, their native country, and where the Dutch have employed all their care to subject them and to render them tame, without having been hitherto able to succeed. That which has served for the subject of our description, was very wild when he arrived at the royal menagerie in France; and he was never entirely tamed. Nevertheless, he was broken for the saddle; but there were precautions necessary; two men held the bridle, while a third was upon him. His mouth is very hard; his ears so sensible, that he winces whenever any person goes to touch them. He is restive, like a vicious horse, and obstinate as a mule; but, perhaps, the wild horse and the onagra are not less intractable; and there is reason to believe, that if the zebra was accustomed to obedience

and tameness from his earliest years, he would become as mild as the ass and the horse, and might be substituted in their room.

The zebra is chiefly found in the southern parts of Africa; often seen near the Cape of Good Hope, and a penalty of fifty rix dollars is inflicted on any person who shoots one of them. Such of them as are caught alive, are presented to the governor. Several have been brought to England; but except in one instance, they have all displayed great wildness, and even ferocity. The exception was in that which was burnt some years ago at Exeter 'Change. It would allow young children to be put upon its back, and was once ridden from the Lyceum to Pimlico; but it was bred and reared in Portugal, from parents half reclaimed. In several other cases, zebras have attempted to injure spectators, and have not even spared their keepers. The voice of this creature is thought to have a distant resemblance to the sound of a post horn.

THE ZEBRA OF THE PLAINS.[1]

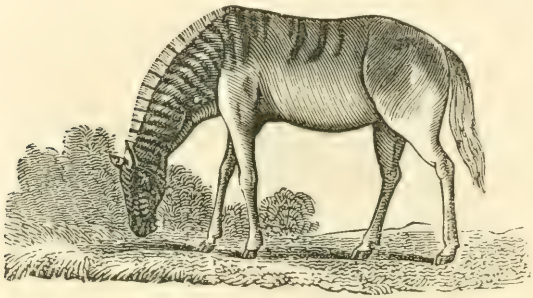
The zebra which we have just described, is confined to the mountains the subject of the present article inhabits the flat parts near the Cape. Till very recently, the difference between them was not accurately understood. "The ground color of its whole body," says Mr Bennett, "is white, interrupted by a regular series of broad black stripes extending from the back across the sides, with narrower and fainter ones intervening between each. Over the haunches and shoulders, these stripes form a kind of bifurcation, between the divisions of which there are a few transverse lines of the same color; but these suddenly and abruptly cease, and are not continued on the legs, which are perfectly white. Along the back there is a narrow, longitudinal line, bordered on each side with white. The mane is throughout broadly and deeply tipped with black, and is marked by a continuation of the transverse bands of the neck. The lines of the face are narrow and beautifully regular; from the centre of the forehead they radiate downwards over the eyes; along the front of the muzzle they are longitudinal, the outer ones having a curve outwards; and on the sides they form broader transverse bands. From the confluence of these bands on the extremity of the muzzle, the nose, and the lower lip, those parts become of a nearly uniform blackish brown. The tail is white: there is no longitudinal ventral line and a large black patch occupies the posterior part of the ear, near the tip The hoofs are moderately large, deep in front, shallow behind, and much expanded at their margin."

The subject of the present article, which has now been about two years in the menagerie, will suffer a boy to ride her about the yard; and is

[1] *Equus montanus*, Burchell.

frequently allowed to run loose through the Tower, with a man by her side, whom she does not attempt to quit, except to run to the canteen, where she is occasionally indulged with a draught of ale, of which she is particularly fond.

THE QUAGGA.[1]



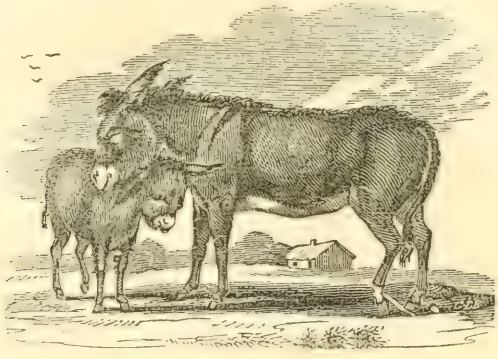
The quagga, which till lately has been confounded with the zebra, is now acknowledged as a distinct species, much allied to the former, but marked with fewer and larger bands, which are of a browner color than in the zebra, and are chiefly disposed on the fore parts of the animal; while the hind parts are rather spotted than striped. The ground color also of the quagga is of a ferruginous tinge, especially on the thighs and back. It is of a milder nature than the zebra, and is said to have been successfully used by some of the Dutch colonists at the Cape, in the manner of a horse, for draught, &c. It inhabits the same parts of Africa as the zebra, but is found in separate herds, never associating with that species.

THE DOMESTIC ASS[2]

Is naturally as humble, patient, and quiet, as the horse is proud, ardent, and impetuous. He suffers with constancy, and perhaps with courage, chastisement and blows. He is moderate, both as to the quantity and quality of his food. He is contented with the hardest and most disagreeable herbs, which the horse, and other animals, will leave with disdain. He is very delicate, with respect to his water, for he will drink none but the clearest, and from rivulets which he is acquainted with. He drinks as moderately as he eats, and does not put his nose in the water, through fear, as some

[1] *Equus couagga*, Gmel. [2] *Equus asinus*, Lin.

say, of the shadow of his ears; as care is not taken to currycomb him, he frequently rolls himself on the grass, thistles, and in the dust; and, without regarding his load, he lays himself down to roll about as often as he can and by this seems to reproach his master for the little care he takes of him. For he does not paddle about in the mud and in the water; he even fears to wet his feet, and will turn out of his road to avoid the mud. His legs are also drier and cleaner than the horse; he is susceptible of education, and some have been seen sufficiently disciplined to be made a show of.



In their earliest youth they are sprightly, and even handsome. They are light and genteel; but either from age or bad treatment, they soon lose their beauty, and become slow, indocile, and headstrong. Pliny assures us, that, when they separate the mother from the young one, she will go through fire to recover it. The ass is also strongly attached to his master, notwithstanding he is usually ill treated; he will smell him afar off, and can distinguish him from all other men. He also knows the places where he has lived, and the ways which he has frequented. His eyes are good, and his smell acute; his ears are excellent, which has also contributed to his being numbered among timid animals, all of which, it is pretended, have the hearing extremely delicate, and the ears long. When he is overloaded, he shows it by lowering his head and bending down his ears. When he is greatly abused, he opens his mouth, and draws back his lips in a most disagreeable manner, which gives him an air of derision and scorn. If his eyes are covered over, he remains motionless; and when he is laid down on his side, and his head is fixed in such a manner that one eye rests on the ground, and that the other is covered with a piece of wood or stick, he will remain in this situation without any motion or endeavor to get up. He walks, trots, and gallops like the horse; but all his motions are smaller, and much slower: notwithstanding he can run with tolerable swiftness, he can gallop but a little way, and only for a small space of time, and, whatever pace he uses, if he is hard pressed, he is soon fatigued.

The ass is three or four years in growing, and lives twenty-five or thirty years. They sleep less than the horse, and do not lie down to sleep unless when quite tired.

There are among asses different races, as among horses; but they are much less known, because they have not been taken the same care of, or followed with the same attention; but we cannot doubt that they came all originally from warm climates. Aristotle assures us, that there were none in his time in Scythia, nor in the other neighboring countries of Scythia, nor even in Gaul, which, he says, is a cold climate; and he adds, that a cold climate either prevents them from procreating their species, or causes them to degenerate; and that this last circumstance is the reason that they are small and weak in Illyria, Thrace, and Epirus. They appear to have come originally from Arabia, and to have passed from Arabia into Egypt, from Egypt into Greece, from Greece into Italy, from Italy into France, and afterwards into Germany, England, and lastly into Sweden, &c.; for they are, in fact, weak and small in proportion to the coldness of the climate. They are said to have been introduced into England subsequently to the reign of Elizabeth. Of all the various breeds of asses, the Spanish breed is by far the finest. They are often found of the height of fifteen hands, and the value of a hundred guineas. In the northern parts of the United States, the ass is little used; in the middle and southern States they are common; in the West Indies, Mexico, and South America, they are the chief beasts of burden. In travelling over the Andes they are of the utmost utility.

The ass is, perhaps, with respect to himself, the animal which can carry the greatest weight; and as it costs but little to feed him, and he scarcely requires any care, he is of great use in the country, at the mill, &c.; he also serves to ride on, as all his paces are gentle, and he stumbles less than the horse; he is frequently put to the plough, in countries where the earth is light, and his dung is an excellent manure to enrich hard moist lands. Nothing is more common in Europe than to see men in humble circumstances riding on asses and mules. In New England a man would almost as soon be seen mounted on a cow, as on one of these creatures.

The ass, like some other animals, and some birds, possesses in great perfection the power of finding his way home, when lost at a great distance. An instance of this is recorded by Kirby and Spence, in their excellent Introduction to Entomology. In March, 1816, an ass, the property of Captain Dundas, R. N. then at Malta, was shipped on board the Ister frigate, Captain Forrest, bound from Gibraltar for that island. The vessel having struck on some sands off the Point de Gat, at some distance from the shore, the ass was thrown overboard, to give it a chance of swimming to land,—a poor one, for the sea was running so high, that a boat which left the ship was lost. A few days afterwards, however, when the gates of Gibraltar were opened in the morning, the ass presented himself for admittance, and proceeded to the stable of Mr Weeks, a merchant, which he had former-

ly occupied, to the no small surprise of this gentleman, who imagined that. from some accident, the animal had never been shipped on board the Ister.

On the return of this vessel to repair, the mystery was explained; and it turned out, that Valiante (as the ass was called,) had not only swam safely to shore, but, without guide, compass, or travelling map, had found his way from Point de Gat to Gibraltar, a distance of more than two hundred miles, thro ugh a mountainous and intricate country, intersected by streams, which he had never traversed before, and in so short a period, that he could not have made one false turn. His not having been stopped on the road was attributed to the circumstance of his having formerly been used to whip criminals upon, which was indicated to the peasants, who have a superstitious horror of such asses, by the holes in his ears, tc which the persons flogged were tied.

THE MULE

is an intermediate creature, springing from the union of the male ass with the mare, or of the horse with the female ass, (the former being the best,) and it accordingly inherits the small legs and handsome shape of the horse, and the long ears, and cross on the back, which characterize its more humble parent. In obstinacy it surpasses the latter; but it is valuable for its sureness of foot, which enables it to pass with safety along the most tremendous precipices, if left to the guidance of its own instinct. The mule is fond of handsome trappings, and is longer lived than either the horse or the ass. This animal is much used in the southern states, in the West Indies, and in South America.

ORDER IX.—RUMINANTIA.*

Animals of this order have no incisors in the upper jaw; in the lower jaw usually eight; a vacant space between the incisors and the molars, but in which one or two canines are found in some genera. Molars, twelve in each jaw, the crown marked with two double crescents of enamel, of which the convexity is outwards in the lower jaw, and inwards in the upper. No clavicles; extremities disposed for walking; two toes furnished with hoofs; metacarpal and metatarsal bones united; four stomachs; intestines long; two or four inguinal mammæ; horns in the males, and often in the females of most species.

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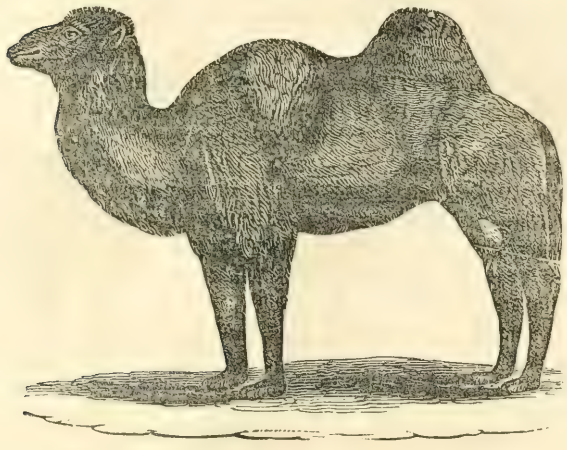
* The term ruminantia, indicates the singular faculty of masticating the food twice. The first three of the stomachs of these animals are disposed in such a manner that their food may enter into either of them. Their food is invariably vegetable, and they are widely distributed over both continents.

THE CAMEL[1] AND DROMEDARY.[2]



The principal, and, as may be said, the only perceptible character by which these animals differ, consists in the camel's bearing two bunches, or protuberances, and the dromedary only one. The latter is also much less, and not so strong as the camel; but both of them herd and procreate together; and the production from this cross-breed is more vigorous, and of greater value, than the others.

This mongrel issue from the dromedary and the camel forms a secondary breed, which also mix and multiply with the first; so that in this species, as well as in that of other domestic animals, there is to be found a great variety, according to the difference of the climates they are produced in. Aristotle has judiciously marked the two principal breeds; the first, (which has two bunches,) under the name of the Bactrian camel; and the second, under that of the Arabian camel. The first are called Turcoman, and the others, Arabian camels. This division still subsists, with this difference only, that it appears, since the discovery of those parts of Africa and Asia which were unknown to the ancients, that the dromedary is, without comparison, more numerous and more universal than the camel. The last

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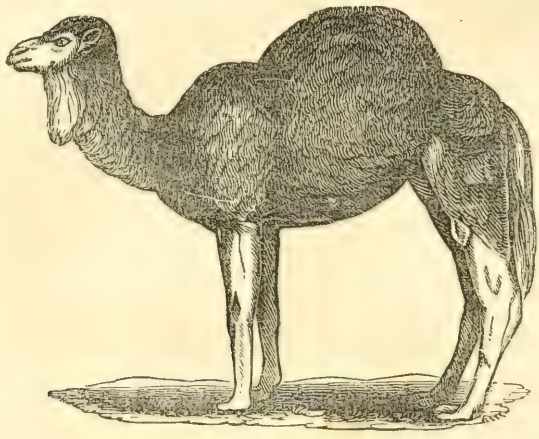
[1] *Camelus Bactrianus*, Lin.

[2] *Camelus dromedarius*, Lin. The genus *Camelus*, of which these two are the only individuals, has two upper and six lower incisors; two upper and two lower canines; two upper and two lower false molars; ten upper and ten lower true molars. Inferior incisors in the form of cutting wedges; the superior, lateral; canines conical, erect and strong; false molars on each side in the interdentary space; toes united below; head long; neck very long; upper lip cleft; nostrils slit obliquely; eyes projecting; ears small; pinna with fatty bunches; callosities on the breast and flexures of the extremities; four ventral mammæ; hair wooly; tail of medium length.

being seldom found in any other place than in Turkey, and in some other parts of the Levant; while the dromedary, more common than any other beast of his size, is to be found in all the northern parts of Africa, in Egypt, in Persia, in South Tartary, and in all the northern parts of India.



The dromedary, therefore, occupies an immense tract of land, while the camel is confined to a small spot of ground; the first inhabits hot and parched regions; the second a more moist and temperate soil. The camel appears to be a native of Arabia; for it is not only the country where there is the greatest number, but it is also best accommodated to their nature. Arabia is the driest country in the world; and the camel is the least thirsty of all animals, and can pass seven days without any drink. The feet of the camel are formed to travel in sand; while, on the contrary, he cannot support himself in moist and slippery ground. Herbage and pasture are wanting to this country, as is the ox, whose place is supplied by the camel.

The Arabs regard the camel as a present from heaven, a sacred animal, without whose aid they could neither subsist, trade, nor travel. It has been emphatically called the ship of the desert. Its milk is their common nourishment; they likewise eat its flesh, especially that of the young ones, which they reckon very good. The hair of these animals, which is fine and soft, is renewed every year, and serves them to make stuff for their clothing and their furniture. Blessed with their camels, they not only want for nothing, but they even fear nothing. With them, they can, in a single day, place a tract of desert, of fifty miles, between them and their enemies, and all the armies in the world would perish in the pursuit of a troop of Arabs. Let any one figure to himself a country without verdure, and without water, a burning sun, a sky always clear, plains covered with sand, and mountains still more parched, over which the eye extends, and the sight is lost, with

out being stopped by a single living object. A dead earth, *flayed* (if we may be allowed the expression,) by the winds, which presents nothing but bones of dead bodies, flints scattered here and there, rocks standing upright or overthrown; a desert entirely naked, where the traveller never drew his breath under the friendly shade; where he has nothing to accompany him, and where nothing reminds him of living nature; an absolute void a thousand times more frightful than that of the forest, whose verdure, in some measure, diminishes the horrors of solitude; an immensity which he in vain attempts to overrun; for hunger, thirst, and burning heat, press on him every weary moment that remains between despair and death.

Nevertheless, the Arab has found means to surmount these difficulties, and even to appropriate to himself these gaps of nature. They serve him for an asylum; they secure his repose, and maintain him in his independence.

An Arab who destines himself to this business of land piracy, early hardens himself to the fatigues of travelling. He accustoms himself to pass many days without sleep; to suffer hunger, thirst, and heat. At the same time he instructs his camels, he brings them up, and exercises them in the same method. A few days after they are born, he bends their legs under their bellies, and constrains them to remain on the earth, and loads them, in this situation, with a weight as heavy as they usually carry, which he only relieves them from, to give them a heavier. Instead of suffering them to feed every hour, and drink even when they are thirsty, he regulates their repasts, and, by degrees, increases them to greater distances between each meal; diminishing, also, at the same time, the quantity of their food. When they are a little stronger, he exercises them to the course; he excites them by the example of horses, and endeavors to render them also as swift, and more robust. At length, when he is assured of the strength and swiftness of his camels, and that they can endure hunger and thirst, he then loads them with whatever is necessary for his and their subsistence. He departs with them, arrives unexpectedly at the borders of the desert, stops the first passenger he sees, pillages the straggling habitations, and loads his camels with his booty. If he is pursued he is obliged to expedite his retreat; and then he displays all his own and his animals' talents. Mounted on one of his swiftest camels, he conducts the troop, makes them travel day and night, almost without stopping either to eat or drink. In this manner, he easily passes over three hundred miles in eight days; and, during all that time of fatigue and travel, he never unloads his camels, and only allows them an hour of repose and a ball of paste each day. They often run in this manner for eight or nine days, without meeting with any water, during which time they never drink; and when by chance they find a pool at some distance from their route, they smell the water at more than half a mile before they come to it. Thirst now makes them redouble their pace; and then they drink enough for all the time past, and for as long to come; for

often they are many weeks in travelling; and their time of abstinence endures as long as they are upon their journey.

In Turkey, Persia, Egypt, Arabia, Barbary, &c., they use no other carriage for their merchandise, than camels, which is, of all their conveyances, the most ready, and the cheapest. Merchants, and other travellers, assemble themselves in caravans, to avoid the insults and piracies of the Arabs. These caravans are often very numerous, and often composed of more camels than men. Every one of these camels is loaded according to his strength; and he is so sensible of it himself, that when a heavier load than usual is put upon him, he refuses it, by constantly remaining in his resting posture, till he is lightened of some of his burden.

Large and strong camels generally carry a thousand, and even twelve hundred weight; the smaller only six or seven hundred. In these commercial journeys they do not travel quick; and as the route is often seven or eight hundred miles, they regulate their stages. They only walk, and go every day ten or twelve miles; they are disburthened every evening, and are suffered to feed at liberty. If they are in a part of the country where there is pasture, they eat enough in one hour to serve them twenty-four, and to ruminate on, during the whole night; but they seldom meet with pastures, and this delicate food is not necessary for them. They even seem to prefer wormwood, thistles, nettles, furze, and other thorny vegetables, to the milder herbs; and so long as they can find plants to browse on, they very easily live without any drink. When a caravan arrives at a *wadey*, or watering place, in the desert, it usually halts for some days. Nothing can exceed the delight with which both men and beasts reach one of these pools.

The facility with which they abstain so long from drinking, is not pure habit, but rather an effect of their formation. Independent of the four stomachs, which are commonly found in ruminating animals, the camel is possessed of a fifth bag, which serves him as a reservoir to retain the water. This fifth stomach is peculiar to the camel. It is of so vast a capacity, as to contain a great quantity of liquor, where it remains without corruption, or without the other aliments being able to mix with it. When the animal is pressed with thirst, or has occasion to dilute the dry food, and to macerate it for rumination, he causes a part of this water to reascend into the stomach, and even to the throat, by a simple contraction of the muscles.

This animal bears about him all the marks of slavery and pain; below the breast, upon the sternum, is a thick and large callosity, as tough as horn; the like substance appears upon the joints of the legs. And, although these callosities are to be met with in every animal, yet they plainly prove that they are not natural, but produced by an excessive constraint and pain, as appears from their being often found filled with pus. It is therefore evident, that this deformity proceeds from the custom to which these animals are constrained, of forcing them, when quite young, to lie upon their stomach with their legs bent under them, and in that cramped posture

to bear not only the weight of their body, but also the burdens with which they are laden. These poor animals must suffer a great deal, as they make lamentable cries, especially when they are overloaded; and, notwithstanding they are continually abused, they have as much spirit as docility. At the first sign they bend their legs under their bodies, and kneeling upon the ground, they are loaded, without the trouble of lifting the load a great height, which must happen, were they to stand upright. As soon as they are loaded, they raise themselves up again without any assistance or support; and the conductor, mounted on one of them, precedes the whole troop, who follow him at the same pace as he leads. They have need of neither whip or spur, to excite them; but, when they begin to be fatigued, their conductors support their spirits, or rather charm their weariness, by a song, or the sound of some instrument. When they want to prolong the route, or double the day's journey, they give them an hour's rest; after which, renewing their song, they again proceed on their way for many hours more; and the singing continues until they stop. Then the camels again kneel down on the earth, to be relieved from the burden. They remain in this cramped posture, with their belly crouched upon the earth, and sleep in the midst of their baggage, which is tied on again the next morning, with as much readiness and facility as it was untied before they went to rest.

They have a great plenty of milk, which is thick, and nourishing even for the human species, if it is mixed with more than an equal quantity of water. The females seldom do any labor while they are with young, but are suffered to bring forth at liberty. The profit which arises from their produce, and from their milk, perhaps surpasses that which is got from their labor. In general, the fatter the camels are, the more capable they are of enduring great fatigues. Their hunches appear to be formed only from the superabundance of nourishment; for, in long journeys, where they are obliged to stint them in their food, and where they suffer both hunger and thirst, these hunches gradually diminish, and are reduced almost even, and the eminences are only discovered by the height of the hair, which is always much longer upon these parts than upon any other part of the back.

The young camel sucks its mother a year; and when they want to bring him up so as to make him strong and robust, they leave him at liberty to suck or graze for a longer time, nor begin to load him, or put him to labor, till he has attained the age of four years. The camel commonly lives forty or fifty years.

The camel is not only of greater value than the elephant, but perhaps not of less than the horse, the ass, and the ox, all united together. He alone carries as much as two mules. He not only eats less, but likewise feeds on herbs as coarse as the ass. The female furnishes milk a longer time than the cow. The flesh of the young camels is good and wholesome, like veal; their hair is finer, and more sought after than the finest wool; there is not a part of them, even to their excrements, from which some

profit is not drawn; for sal ammoniac is made from their urine. Their dung, when dried and powdered, serves them for litter, as it does for horses, with whom they often travel into countries where neither straw nor hay is known. In fine, a kind of turf is also made of this dung, which burns freely, and gives a flame as clear, and almost as lively, as that of dry wood. Even this is another great use, especially in deserts, where not a tree is to be seen, and where, from the deficiency of combustible matters, fire is almost as scarce as water.

At particular seasons of the year, camel fights are common at Smyrna, and at Aleppo. Such exhibitions are the disgrace of the vulgar (be they the high or the low vulgar,) of all countries; and the lion fights of the savage Romans, the bull fights of Spain, the bull and badger baitings and cock fights of England, and the camel fights of Asia Minor, are equally indications of a barbarian spirit, which can only be eradicated by knowledge and true religion. Of these, however, the camel fights appear the least objectionable.

Mr Mac Farlane thus describes to us this curious scene:—"One of the favorite holiday amusements of the Turks of Asia Minor, is furnished by the camel combats. An inclosure is made, and two camels, previously muzzled, so that they cannot hurt each other much, are driven in, and incited to fight with each other. Their mode of combat is curious; they knock their heads together, (laterally,) twist their long necks, wrestle with their fore legs, almost like bipeds, and seem to direct their principal attention to the throwing down of the adversary. During this combat, the Turks, deeply interested, will back some one camel and some the other; and they will clap their hands and cry out the names of their respective favorites, just as our amateurs do with their dogs, or as the Spaniards, at their more splendid and more bloody bull fights, will echo the name of the hardy bull, or the gallant *matador*.

"I once, however, chanced to see a less innocent contest, which I have noticed in my volume of travels. This was on the plain between Mounts Sipylus and Tartalee, and the town of Smyrna. It was a fight in downright earnest. Two huge rivals broke away from the string, and set to in spite of their drivers. They bit each other furiously, and it was with great difficulty the devidgis succeeded in separating these, at other times, affectionate and docile animals. The popular amusements which the camel affords in other parts of the East are of a less ferocious nature. At a particular season of the year, the Mahomedans in the neighborhood of Mount Sinai have *camel races*, and this festival is a time of great rejoicing."

Burckhardt relates an interesting story, which beautifully illustrates the surprising instinct of the camel. It was told to him by a man who had himself suffered all the pangs of death:—

"In the month of August, a small caravan prepared to set out from Berber to Daraou. It consisted of five merchants and about thirty slaves, with

a proportionate number of camels. Afraid of the robber Naym, who at that time was in the habit of waylaying travellers about the well of Nedjeym, and who had constant intelligence of the departure of every caravan from Berber, they determined to take a more eastern road, by the well Owareyk. They had hired an Ababde guide, who conducted them in safety to that place, but who lost his way from thence northward, the route being very unfrequented. After five days' march in the mountains, their stock of water was exhausted, nor did they know where they were. They resolved, therefore, to direct their course toward the setting sun, hoping thus to reach the Nile. After two days' thirst, fifteen slaves and one of the merchants died; another of them, an Ababde, who had ten camels with him, thinking that the camels might know better than their masters where water was to be found, desired his comrades to tie him fast upon the saddle of his strongest camel, that he might not fall down from weakness. And thus he parted from them, permitting his camels to take their own way; but neither the man nor his camel were ever heard of afterwards. On the eighth day after leaving Owareyk, the survivors came in sight of the mountains of Shigre, which they immediately recognised; but their strength was quite exhausted, and neither men nor beasts were able to move any farther. Lying down under a rock, they sent two of their servants, with the two strongest remaining camels, in search of water. Before these two men could reach the mountain, one of them dropped off his camel, deprived of speech, and able only to move his hands to his comrade as a signal that he desired to be left to his fate. The survivor then continued his route; but such was the effect of thirst upon him, that his eyes grew dim, and he lost the road, though he had often travelled over it before, and had been perfectly acquainted with it. Having wandered about for a long time, he alighted under the shade of a tree, and tied the camel to one of its branches. The beast, however, smelt the water, (as the Arabs express it,) and, wearied as it was, broke its halter, and set off galloping furiously, in the direction of the spring, which, as it afterwards appeared, was at half an hour's distance. The man well understanding the camel's action, endeavored to follow its footsteps, but could only move a few yards. He fell exhausted on the ground, and was about to breathe his last, when Providence led that way, from a neighboring encampment, Bisharye Bedouin, who, by throwing water upon the man's face, restored him to his senses. They then went hastily together to the water, filled the skins, and returning to the caravan, had the good fortune to find the sufferers still alive. The Bisharye received a slave for his trouble. My informer, a native of Yembo, in Arabia, was the man whose camel discovered the spring; and he added the remarkable circumstance, that the youngest slaves bore the thirst better than the rest, and that, while the grown up boys all died, the children reached Egypt in safety."

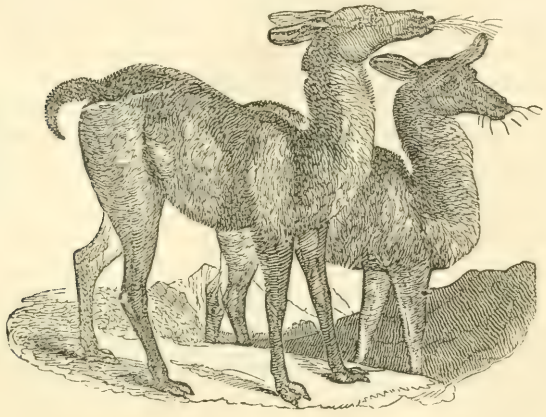
THE LLAMA.[1]

The height of this animal is about four feet; its body, comprehending the neck and head, is five or six feet long; its neck alone is near three feet. The head is small and well proportioned, the eyes large, the nose somewhat long, the lips thick, the upper divided, and the lower a little depending: it wants the incisive and canine teeth in the upper jaw. The ears are four inches long, and move with great agility. The tail is seldom above eight inches long, small, straight, and a little turned up at the end. It is cloven footed, like the ox; but the hoof has a kind of spear-like appendage behind, which assists the animal to move and support itself over precipices and rugged ways. The back is clothed with a short wool, as is the crupper and tail; but it is very long on the belly and sides. These animals differ in color; some are white, others black, but most of them brown. The engraving was drawn from a white llama, in the Zoological Gardens.

The growth of the llama is very quick; and its life is but of short duration. This animal couples so early as at three years of age, and remains strong and vigorous till twelve; after which it begins to decline, and

[1] *Auchenia glama*, Lin. The genus *Auchenia* has two upper and six lower incisors; two upper and no lower canines; two upper false molars; ten upper and ten lower true molars. Teeth resembling those of the camel; muzzle little protuberent; upper lip cleft; neck slender; eyes large; ears long, pointed, and moveable; feet terminated by two toes furnished with little crooked nails, with a callous sole; callosities on the breast and knees; tail short; two mammæ

comes entirely useless at fifteen. They are gentle and phlegmatic, and do every thing with the greatest leisure and caution. When they stop on their journeys, they bend their knees very cautiously, in order to lower their bodies without disordering their load. As soon as they hear their driver whistle, they rise up again with the same precaution, and proceed on their journey. They feed, as they go along, on the grass they meet with in their way, but never eat in the night, making use of that time to ruminate. The llama sleeps, like the camel, with its feet folded under its belly, and ruminates in that posture. When overloaded or fatigued, it falls on its belly, and will not rise, though its driver strikes it with his utmost force.



Peru, according to Gregory de Bolivar, is the true and native country of the llamas; they are conducted into other provinces, as New Spain, &c. But this is rather for curiosity than utility. But in Peru, from Potosi to Caraccas, these animals are in great numbers, and make the chief riches of the Indians and Spaniards, who rear them. Their flesh is excellent food; their hair, or rather wool, may be spun into beautiful clothing; and they are capable of carrying heavy loads in the most rugged and dangerous ways. The strongest of them will travel with two hundred or two hundred and fifty pounds weight on their backs. Their pace is but slow, and their journey is seldom above fifteen miles a day; but then they are sure, and descend precipices, and find footing among the most craggy rocks, where even men can scarcely accompany them. They commonly travel for five days together, when they are obliged to rest, which they do, of their own accord, for two or three days. They are chiefly employed in carrying the riches of the mines of Potosi. Bolivar affirms, that in his time above three hundred thousand of these animals were in actual employ.

These useful, and even necessary animals, are attended with no expense to their masters. For, as they are cloven footed, they do not require to be shod, nor do they require to be housed, as their wool supplies them with a warm covering. Satisfied with a small portion of vegetables and grass, they want neither corn nor hay to subsist upon. They are still more moderate in what they drink; as their mouths are continually moistened with saliva, which they have in a greater quantity than any other animal. The natives hunt the *guanaco*, which is the llama in a wild state, for the sake of its fleece. The dogs have much trouble to follow them; and, if they do not come up with them before they gain the rocks, both the hunters and dogs are obliged to desist in their pursuit.

The llama is in general a timid and docile animal. If teased, or ill treated, however, it becomes spiteful. Their mode of manifesting their anger is singular; it consists in darting their saliva in considerable quantity upon the person who offends them. They will cover with it a surface of three or four yards in extent. In the wood cut, one of the animals is represented in the act of thus showing his displeasure. It has been asserted that the saliva is venomous, but this is an error.

THE PACO[1]

Stands in much the same relation to the llama, that the ass does to the horse. He is smaller, and not so serviceable; but his fleece is more useful. His wool is fine and long, and is a sort of merchandise as valuable as silk. The natural color of the paco is that of a dried rose-leaf, which is so fixed that it undergoes no alteration under the hands of the manufacturers. They not only make good gloves and stockings of this wool, but also form it into quilts and carpets, which bring a higher price, and exceed those of the Levant.

The pacos also resemble the llamas in their form, excepting that their legs are shorter, and their muzzle thicker and closer. They inhabit and climb over the highest parts of the mountains. The snow and ice seem rather agreeable than inconvenient to them. When wild, they keep together in flocks, and run very swift; and as soon as they perceive a stranger, they take flight, driving their young before them. The ancient monarchs of Peru rigorously prohibited the hunting of them, as they multiply but slowly. But since the arrival of the Spaniards in these parts, their number is greatly decreased, so that at present there are very few remaining. The flesh of these animals is not so good as that of the guanacos; and they are only sought after for their fleece, and the bezoar they produce.

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[1] *Auchenia vicunna*, Lin.

The method of taking them, proves their extreme timidity, or rather their weakness. The hunters having driven the flock into a narrow passage, across which they have stretched a rope about four feet from the ground, with a number of pieces of linen or cloth hanging on it, the animals are so intimidated at these rags agitated by the wind, that they stop, and, crowding together in a heap, the hunters kill great numbers of them with the greatest ease. But if there are any guanacos among the flock, which are less timid than the pacos, they leap over the rope with great agility. The example is immediately followed by the whole flock, and they escape the stratagem of their pursuers.

With respect to the domestic pacos, they are used to carry burdens, like the llamas; but, being smaller and weaker, they carry much less weight. They are likewise of a more stubborn nature; and, when once they rest with their load, they will suffer themselves to be cut to pieces sooner than rise. The Indians have never made use of the milk of these animals, as they have scarcely enough to supply their own young. The great profit derived from their wool has induced the Spaniards to endeavor to naturalize them in Europe. They have transported them into Spain, in hopes to raise the breed in that country; but, the climate not agreeing with their nature, not one of them lived. We are, nevertheless, persuaded that these animals, which are more valuable than the llamas, might thrive upon the European mountains, especially upon the Pyrenean. Those who brought them into Spain, did not consider that they can exist, even in Peru, only in the cold regions; that is, on the top of the highest mountains; that they are never to be found in the valleys, and die if brought into hot countries; that, consequently, in order to preserve them, they should be landed, not in Spain, but in Scotland, and even in Norway, and with greater certainty at the foot of the Pyrenean, Alpine, or other mountains, where they migh climb and attain to the region that most agrees with their nature

THE THIBET MUSK.[1]

The size and general appearance of this animal resembles, in some degree, that of the roebuck. It is about three feet four inches in length, and about two feet eight inches in neight, from the top of the shoulders to the bottom of the fore feet; the ears are long and narrow, of a pale yellow in the inside, and deep brown outside. The general color of the body is a deep iron gray. The female is not so large as the male, has two teats, but is destitute of tusks.

[1] *Moschus moschiferus*, Lin. The genus *Moschus* has eight lower incisors, no upper ones; two upper canines, no lower ones; twelve upper and twelve lower molars. Canines wanting altogether in the females; superior canines large in the males; ears long, pointed; body slender; feet with hoofs, separated and enveloping the last phalanges; tail very short; two inguinal mammæ.

These animals are found in the Alpine mountains of Asia, Torquin, and Siberia, and about lake Baikal. In their habits and manners, they are very like the chamois and other mountain goats, leaping with great celerity, and when pursued, taking refuge among the highest and most inaccessible summits. Indeed, their favorite haunts are the tops of mountains covered with pines, where they delight to wander in places the most difficult of access. The flesh of the males is much infected with the taste of musk; but it is eaten by the Russians and Tartars.

They are hunted for the sake of their well known perfume, which is contained in an oval bag, about the size of a small hen's egg, hanging from the abdomen, and peculiar to the male only. This receptacle is found constantly filled with a soft, unctuous, brownish substance, of the most powerful and penetrating scent, and which is the perfume in its natural state. When close, and in large quantities, the smell is very powerful and injurious. It has been known to force the blood from the nose, eyes, and ears, of those who have imprudently or accidentally inhaled its vapors; but at a distance, the scent is usually considered agreeable. A grain of musk is sufficient to perfume an apartment for a considerable time; but in larger quantities it continues to give out its scent for many years, and seems scarcely wasted in its weight, although it has during that time filled the atmosphere to a great distance with its particles. It is employed in medicine, particularly in nervous and hysteric disorders; and in those cases is found to be one of the most powerful remedies in use. The quantity produced from each animal is about a quarter of an ounce, and is found at all seasons of the year; but not in those that are young.

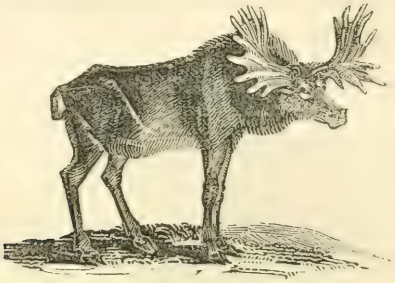
Many thousands of these bags are sent over annually to Europe, besides the great consumption which exists in different parts of the East; for Tavernier says, that he bought, in one journey, seven thousand six hundred and seventy-three musk bags. To account for which, it is supposed that the musk is frequently mixed and adulterated with the blood of the animal.

THE ELK, OR MOOSE,[1]

Is a much larger, and a much stronger animal than the stag and the reindeer. It is usually larger, both in height and bulk, than the horse. His hair is so rough, and his hide so hard, that a musket ball cannot penetrate it. His legs are very firm, with so much motion and strength, especially

[1] *Cervus alces*, Lin. The genus *Cervus* has eight incisors below; canines none, or two above; molars twelve above and twelve below. Canines compressed and bent back; head long, terminated by a muzzle; eyes large, pupils elongated transversely; a lachrymal sinus in most; ears large and pointed; tongue soft; body slender; four inguinal mammæ; horns solid, deciduous, palmated, branched, or simple in the males; females, with one exception, without horns.

in the fore feet, that he can kill a man by one single stroke of his foot; nevertheless, he is hunted nearly as we hunt the stag; that is, with men and dogs. It is affirmed, that when he is touched with the lance, or pursued, it happens that he often falls down all at once, without either being

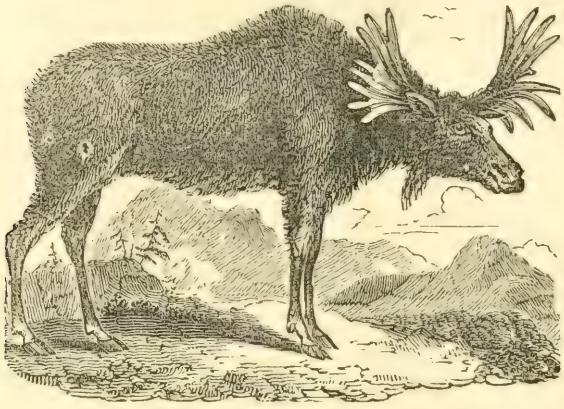


pulled down or wounded. From this circumstance, some have presumed he was subject to the epilepsy; and on this presumption, which is not well founded, (since fear alone might be able to produce the same effect,) this absurd conclusion has been drawn, that his hoof is a remedy for the epilepsy, and even preserves persons from it. His pace, when disturbed, is a rapid kind of trot. In walking, he lifts his feet very high, and can, without difficulty, step over a gate that is five feet high.

Naturalists have generally considered the moose deer to be the same species with the elk of the northern parts of the Old World; but the fact that few of the American quadrupeds have been found precisely similar to their European representatives, ought to excite doubts of the identity of the moose and Scandinavian elk. The moose exists in considerable numbers, near the Bay of Fundy; and frequents the woody tracts in the fur countries to their most northern limit, and on the Mackenzie and Coppermine rivers, where they feed on the willows and aspen. They are rarely, if ever, found west of the Rocky Mountains. In the more northern parts, the moose is quite a solitary animal. It has the sense of hearing in very great perfection, and is the most shy and wary of all the deer species, and on this account moose hunting is looked upon as the greatest of an Indian's acquirements. The skill of a moose hunter is most tried in the early part of the winter, as the animal is tracked by its foot marks on the snow; and it is necessary that he should keep constantly to leeward and use the utmost caution, for the rustling of a leaf is sufficient to alarm the watchful beast. In this manner, he tracks the animal, till by the marks on the snow he discovers that he is very near to him. He then breaks a twig, which, alarming the moose, it springs up and prepares to start. The hunter now fires, and seldom fails in killing him.

In the spring, when the snow is very deep, the hunters frequently chase them on snow shoes. Notwithstanding the lengthened chase which the

moose can sustain on the snow, Hearne remarks that it is both tender footed and short-winded; though instances are recorded of its eluding pursuit for six successive days. The same author says, that, in summer, moose deer are often killed in the water by the Indians, as when they are crossing the rivers or lakes, they never make any resistance. They are the easiest to domesticate of any of the deer kind.



The flesh of the moose is more relished by the Indians, and residents in the fur countries, than that of any other animal, principally, on account of its soft fat. It bears a greater resemblance to beef in its flavor, than to venison. The nose is considered most excellent food. The moose acquires a large size, occasionally weighing eleven or twelve hundred pounds. Its skin, when properly dressed, makes a soft, thick, pliable leather, excellently adapted for moccasins, or other articles of winter clothing. Its movements are very heavy; it shuffles or ambles along, its joints cracking at every step, with a sound heard to some distance. During its progress, it holds up its nose so as to lay the horns back horizontally. Although its figure is uncouth, yet when seen in a wilderness, in all the glory of its full grown horns, no animal could appear more majestic or imposing.

THE STAG[1]

Is one of those mild, tranquil, innocent animals, which seem as if they were created solely to adorn and animate the solitude of the forests, and to occupy

[1] *Cervus elaphus*, LIN.

remote from man, the peaceful retreats of nature. His light and elegant form; his flexible, yet nervous limbs; his head rather adorned, than armed, with a living substance, like the branch of a tree, which is every year renewed; his size, his swiftness, his strength, sufficiently distinguish him from the rest of the inhabitants of the forest.

The old stags shed their horns first, which happens about the end of February, or the beginning of March. Stags in their seventh year do not undergo this change till the middle or the end of March; nor do those in their sixth year, till the month of April.

After they have shed their horns, they separate from each other; the very young ones, alone, associating together. They remain no longer in covert; they seek the beautiful parts of the country, the groves, and the open coppices, where they remain all the summer, till they recover the antlers which were wont to adorn their brows. And, during this season, they carry their heads low, for fear of striking them against the branches; for they are exceedingly tender till they arrive at perfection. The horns of the oldest stags are scarcely half repaired by the month of May; nor do they attain their full length and hardness till about the end of July. The horns of the young stag are very late shed, and very late recovered; but when these are completely lengthened, and are become quite hard, they rub them

against the trees, in order to clear them from the scurf with which they are covered.

The hinds, or females, carry their young eight months, and a few days. They are not all prolific; and one sort there is in particular, which is always barren. The fawn retains this appellation no longer than till it is six months old; then the knobs begin to appear, and it takes the name of a knobber, which it bears till these knobs are lengthened to so many points, whence they are termed prickets, or brockets. It does not quit its mother early, though it grows fast, but follows her all the summer. In winter, the hinds, the knobbers, the prickets, and the young stags resort to the herd, forming troops, which are more numerous in proportion as the season is more severe. In spring, they divide, the hinds retiring to bring forth their young; and at this time there are scarcely any but the prickets and the young stags, which go together. In general, the stags are inclined to remain with each other, and to roam abroad in companies; it is only from fear or necessity that they are ever found dispersed or separated.

The growth of the horns appears to depend on the redundancy of the fluids; and the beauty of this, as indeed of every part, depends much upon their food.

The stag passes his whole life in the alternatives of plenitude and want, of corpulence and leanness, of health and sickness, without having his constitution much affected by the violence of the change; nor is the duration of his life inferior to that of other animals which are not subject to such vicissitudes. As he is five or six years in growing, so he generally lives seven times that number of years; that is, thirty-five or forty years. What has been reported, therefore, concerning the prodigious longevity of the stag, is without any good foundation, though supported by the story of one which was taken by Charles VI. in the forest of Senlis, with a collar round his neck, whereon was inscribed, "Cæsar hoc me donavit;" and people chose rather to believe that this animal had lived a thousand years, and had received this collar from a Roman emperor, than to conclude that he might come from Germany, where the emperors have always assumed the title of Cæsar.

The horns of the stag continue to increase in bulk and height, from the second year to the eighth. They remain beautiful, and much the same, during their vigor of life; but as their body declines with age, so do their horns decline also.

It is but seldom that the stags of Europe have more than twenty or twenty-two antlers, even when their head is in its most beautiful state; and, as the size of the stag's head depends on the quantity of his food, so the quality of his horns is found also to depend on the kind of nourishment he receives. It is like the wood of the forest, large, soft, and light, in moist and fertile countries; and, on the contrary, short, hard, and heavy, in such as are dry and barren.

The most common color of the stag is yellow, though there are many found of a brown, and many of a red color. White stags are much more uncommon, and seem to be stags become domestic. The color of the horns, like that of the hair, seems in particular to depend on the nature and age of the animal. The horns of the young stags are whiter than those of the old ones. Of those stags, also, whose hair is of a light yellow, the horns are often of a sallow hue, and disagreeable to the eye.

This animal seems to have good eyes, an exquisite smell, and an excellent ear. When he would hearken to any thing, he raises his head, pricks up his ears, and then he hears from a great distance. When he issues from a little coppice, or some other spot half covered, he stops, in order to take a full view around him, and then snuffs up the wind, in order to try whether he can discover the scent of aught that may give him disturbance. Though naturally rather simple, he is yet far from being destitute of curiosity and cunning. If any one whistles, or calls aloud to him from a great distance, he instantly stops short, and gazes with fixed attention, with even a kind of admiration; and if he sees neither arms nor dogs, he passes along quietly, and without altering his pace. With equal tranquillity and pleasure he seems also to listen to the shepherd's pipe, or flageolet; and the hunters, in order to embolden him, sometimes use these instruments. In general, he fears men much less than he does dogs, and entertains neither distrust nor artifice, but in proportion as he is disturbed. He eats slowly, chooses his food, and seeks afterwards to repose himself, that he may ruminate at leisure, though the act of rumination he does not seem to perform with the same ease as the ox; nor is it without undergoing much violence that the stag can throw up the food contained in his first stomach. He seldom drinks in the winter, and seldomer still in the spring.

In England, the number of red deer is diminishing. This has, no doubt, arisen, from the grazing of sheep and cattle, by which the seclusion the red deer are so fond of, has been broken in upon, both in the mountains and in the valleys. As the more lucrative occupation of the soil extends into the remoter districts, the race must further and further decrease; nor is the period at which they will be wholly extinct, in all probability, very distant. Now, unless by a person, whom long observation has rendered familiar with their haunts, the country may be traversed without seeing even one. From their fleetness, and the nature of the ground on which they are found, horses and hounds are of no direct use in the chase of them, as the steed would be required to leap precipices of fifty feet, instead of gates of five bars; and the dogs would be constantly tumbling into gullies and ravines, which are cleared by the deer at one bound. They cannot be driven "with hound and horn," as was the case in the days of "the barons bold;" neither can they be collected and hemmed in, after the somewhat similar manner in which the Highland chiefs conducted their sports. Still, there are a few places where a person who has been habituated to the occupation, and who

does not fear to ground himself in a morass, and will submit to the other pleasures of "stalking," may occasionally find a roe. The most certain time is, when the state of the weather is such as to force the herds to the well-heads, where there is brushwood near to cover the marksman.

"The largest forest set apart for red deer which exists in Scotland, is the forest of Atholl, where a hundred thousand English acres are given up to them; and upon this large tract neither man, woman, child, sheep, nor oxen are allowed to trespass, with the exception of those parties who are permitted to partake of the mysteries of deer stalking.

"The sportsmen, seldom more than two in each party, set forth, accompanied by a keeper who acts as general; and they are followed by two or three Highlanders, carrying spare rifles, and leading the deer hounds. The party is preceded by the keeper, who is about twenty or thirty yards in advance, attentively examining the face of every hill with his telescope, to discover the deer that may be grazing upon it. Upon detecting a herd, a council of war is held, and the plan of operations determined upon. It is necessary to proceed with much caution, as, independent of the strong sense of smelling, seeing, and hearing, which these animals are endued with, there is always one of the herd, generally a hind, or female deer, stationed as sentinel; and, upon the least suspicion being excited, the signal is given, and they are off. Great care is therefore taken, in the approach, to advance up the wind, and to conceal the party by taking advantage of the inequalities of the ground, preserving the strictest silence. It frequently happens, that the sportsmen are obliged to make a circuit of some miles, to get near them undetected—at other times they may find that they are in a situation, from which they cannot extricate themselves unseen. In that case, they must lie down till the herd move into a more favorable position for their purpose. Having arrived as near to them as is possible without detection, the sportsmen, after a careful examination of their rifles, still keeping themselves as much concealed as possible, fire, and continue firing and loading, as long as they remain within practicable distance. Eleven out of a herd of fifteen have been known to be killed by one person. The accidental circumstance of an echo, the sound being heard on one side and the flash appearing on the other, so puzzled the deer, that they stood still, till the four last gathered courage and made off. When wounded, large hounds, of a breed between the greyhound and the bloodhound, are let loose upon the track of their blood, and they never leave it till they have brought the animal to bay; generally, in some stream, where they keep him till the sportsman comes up and dispatches him by shooting him through the head. It is necessary for the hunter to be very cautious in approaching him when at bay, and always to keep him down the stream, from where he stands; for if he breaks his bay, he is very likely to attack his pursuer, gore him with his horns, or trample him to pieces with his feet."

THE MALAYAN RUSA DEER[1]

Is a native of India, and of the Indian islands. "He is," says Mr Bennett, "dark cinereous brown above, nearly black on the throat and breast, and light fawn, intermixed with dirty white, on the inside of the limbs. His eyes are surrounded by a fawn colored disc, and patches of the same color occupy the fore knees, and a space above each of the hoofs in front. His nose, which is black, is enveloped in an extensive muzzle; his ears are nearly

naked on the inside, and marked by a patch of dirty white at the base externally; and his mane, which spreads downwards over the neck and throat, is remarkably thick and heavy. His tail is black above, and light fawn beneath; and a disc of the latter color occupies the posterior part of the buttocks, having on each side a blackish line which separates it from the lighter tinge of the inside of the thighs. His horns, when properly grown, consist of a broad burr, from which the pointed basal antler rises almost perpendicularly to the extent of nine or ten inches; of a stem, which is first directed outwards, and then forms a bold curve inwards; and of a snag, or second antler of smaller size, arising from the stem near its extremity on the posterior and internal side, and forming with it a terminal fork, the branch, however, being shorter than the stem, and not exceeding five or six inches in length. The entire length of the horns is about two feet; they are of a dark color, very strong, and deeply furrowed throughout.

[1] *Cervus equinus*, Cuv.

THE INDIAN STAG.[1]

The axis, or Indian stag, is of the small number of ruminating animals who wear horns, like the stag. He has the shape and swiftness of the fallow deer; but what distinguishes him from the stag and fallow deer is, that his body is marked with white spots, elegantly disposed, and separated one from another, and that he is a native of hot countries, Hindostan, and particularly Bengal; while the stag and deer have their coat of a uniform color, and are to be met with in greater numbers, in cold countries and temperate regions, than in hot climates.

The axis appears to be an intermediate mixture between the deer and the stag. He resembles the deer in the size of his body, the length of his tail, and his coat, which is the same during his whole life. He only essentially differs from that animal in his horns, which nearly resemble those of the stag. The axis, therefore, may possibly be only a variety depending on the climate, and not a different species from the deer; for, although he is a native of the hottest countries of Asia, he supports, and easily multiplies in that of Europe. He is a very mild and timid animal.

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[1] *Cervus axis*, Lin.

THE FALLOW DEER.[1]

No two animals can be more nearly allied than the stag and the fallow deer; and yet no two animals keep more distinct, or avoid each other with more fixed animosity. They are never seen to herd in the same place; it is even rare, unless they have been transported thither, to find fallow deer in a country where stags are numerous. They seem to be of a nature less robust and less savage than the stag. They are found but rarely wild in the forests, and are bred up in parks, where they are, as it were, half domestic.

England is the country of Europe where they most abound; and there, their flesh, which dogs are observed to prefer to that of all other animals, is held in no small estimation. It seems to be an animal formed for a temperate climate; for it is never found in Russia, and very rarely in the forests of Sweden, or in any other northern country; and as the fallow deer is an animal less savage, more delicate, and, indeed, it may be added, more domestic than the stag, it is likewise subject to a greater number of varieties.

The horns of the buck, like those of the stag, are shed every year, and take nearly the same time for repairing.

It frequently happens, that a herd of fallow deer is seen to divide into parties, and to engage each other with great ardor. Each seems desirous of gaining some favorite spot of the park for pasture, and of driving the vanquished party into the coarser and more disagreeable parts. Each

[1] *Cervus dama*, Lin.

of these factions has its particular chief, namely, the oldest and the strongest of each herd. These lead on to the engagement; and the rest follow under their direction. Their combats are singular enough, from the disposition and conduct by which their mutual efforts seem to be regulated. They attack with order, and support and assault with courage; they come to the assistance of each other; they retire, they rally, and never yield the victory upon a single defeat. The combat is renewed every day, till at length the most feeble side is obliged to give way, and is content to escape to the most disagreeable part of the park, where alone they can find safety and protection. The fallow deer may easily be brought to live in stables and seems to acquire an affection for the horse. One which was kept at Newmarket, in England, used to delight in galloping round the course with the racers while the jockeys were exercising them.

From the age of two years, till that of fifteen or sixteen, the fallow deer is in a condition to produce, and, in fine, resembling the stag in all its natural habits, the greatest difference we find between these two animals, is in the duration of their lives. From the testimony of hunters, it has been mentioned, that the stag lives to the age of thirty-five or forty; and, on the same authority, it is asserted, that the fallow deer lives but about twenty years; and as in size the latter is smaller than the stag, so it is probable that in growth he is somewhat quicker.

Besides the nostrils, the fallow deer is furnished with two spiracula, or breathing places, one at the inner corner of each eye, communicating with the nose. By this means it continues to breathe while drinking, which it could not otherwise do, as it plunges its nose deep under water, and retains it there for a considerable time. These spiracles, it is probable, may also be useful to the animal when chased, by enabling it to respire more fully and easily.

THE ROEBUCK.[1]

The stag, as being the most noble among the tenants of the woods, inhabits the most secret parts of the forest, where the spreading branches form a lofty covert. While the roebuck, as being of an inferior species, confines himself with a more lowly residence, and is seldom found but among the thick foliage of young trees and shrubs. But, if this animal is less noble, less strong, and less elevated in stature, he is, however, possessed of more grace, more vivacity, and even more courage, than the stag. Though but a very small animal, yet, when his young are attacked, he faces even the stag himself, and not unfrequently comes off victorious.

[1] *Cervus capreolus.* Lin.

So fleet is the roebuck, that it is nearly impossible to hunt him down; and such are his strength and wind, that he can run unexhausted for several hours. Should he, however, be at length pressed too closely, he resorts to artifice. He retraces his footsteps, backwards and forwards, till his turnings and windings have confused the scent; and, when this is accomplished, he springs aside at one vast bound, and lies flat on his belly among the grass and bushes, till the dogs have gone by; nor does he make the least motion, even should they pass close to his nose.

The roebuck differs from the stag, not only in superior cunning, but also in his natural appetites, his inclinations, and his whole habits of living. Instead of herding together like the latter, the species of the former live in separate families. The sire, the dam, and the young ones, form of themselves a little community, nor do they ever admit a stranger into it. All other animals of the deer kind are inconstant in their affection. The roebuck never forsakes his mate; and, as they have been generally bred up together, the male and female form for each other the strongest attachment.

The female of this species goes with young five months and a half, and brings forth about the end of April, or the beginning of May. The hind goes more than eight months; and this is a circumstance which alone suffices to prove, that these animals are of a species so different, that they can never intermix, nor produce together an intermediate race. The female separates herself from the male, when she is about to bring forth, retiring into the thickest part of the woods, in order to avoid the wolf, which is her most dangerous enemy. At the expiration of about ten or twelve days, the fawns, of which there are generally two at a birth, attain strength enough to follow her. When she is threatened with any peril, she hides them in some deep thicket, offers herself to the danger, and allows herself to be chased in their stead.

The fawns continue to follow the buck and the doe eight or nine months in all; and, upon separating, their horns begin to appear, as those of the stag, the first year, simple, and without antlers. These they shed at the latter end of autumn, and renew during the winter.

In the stag, the fallow deer, and the roebuck, there are two bony eminences, on which their horns grow, which begin to shoot at the end of five or six months, and which, in a little time longer, arrive at their full growth; and, far from enlarging themselves as the animal advances in age, they diminish, and are even the most certain index for discovering, every year, the advanced age of all the species.

As the female goes only five months and a half with young, and as the growth of the young roebuck is quicker than that of the young stag, so his life is shorter, and does not appear to extend beyond twelve or fifteen years, at the farthest. The roebucks remain in winter in the thickest coppices, and live on briars, broom, heath, &c. In spring, they repair to the more

open groves, and browse upon the buds and young fresh leaves of almost every tree; and this warm food, fermenting in their stomachs, inebriates them in such a manner, that they are then easily surprised.

The roebuck is the smallest of the British deer. The species is now nearly extinct in England. They are somewhat more plentiful in the highlands of Scotland.

THE VIRGINIA, OR AMERICAN FALLOW DEER.[1]

This is the smallest species known in America. It is found throughout the country, from Canada in the north, and the banks of the Oronoco in South America. It is remarkable for the slenderness and delicacy of its form. Its long and slim neck, small body, and almost pointed head, give the animal an air of feebleness, the impression of which is only to be counteracted by observing the animated eye, the playful movements, and admirable celerity of its course when at full speed.

The Virginia deer is of great importance as an abundant source of food and raiment. Vast numbers are annually destroyed for the sake of their flesh, hide, and horns. The flesh is justly considered an excellent article of food, when killed in the proper season. The Indians and hunters feed upon it at all seasons. The stomach of the deer, with its half digested

[1] *Cervus Virginianus*, Desm

contents, is a very favorite dish with almost all the savages, especially toward the north, where deer feed in a great degree on mosses and buds.

This species of deer has very keen senses, especially of hearing and smelling, upon which its safety particularly depends. It is a very shy and timid animal, and the slightest noise excites his attention, and if the cause of alarm be continued, he exerts his strength, and dashes off in his swiftest career. It is said by hunters to evince a strong degree of animosity towards serpents, and especially to the rattlesnake, of which it has an instinctive horror. In order to destroy one of these creatures, the deer makes a bound into the air, and alights upon the snake with all four feet brought together in a square, and these violent blows are repeated till the hated reptile is destroyed. The skins of this deer continue to form a very valuable article of commerce, and furnish a material better adapted for the manufacture of gloves and other articles, than the skin of any other animal with which we are acquainted.

THE AMERICAN ELK, CANADA STAG, OR WAPITI.[1]

This species is second in size to the moose alone. The size and appearance of the elk are imposing; his air denotes confidence of great strength, while his towering horns exhibit weapons capable of doing much injury when offensively employed. It is not uncommon to see them four or five

feet in height, and it is said they are sometimes still higher. The elk has at one period ranged over the greater part, if not the whole, of this continent. Hearne leaves no doubt of its existence as far north as fifty-three

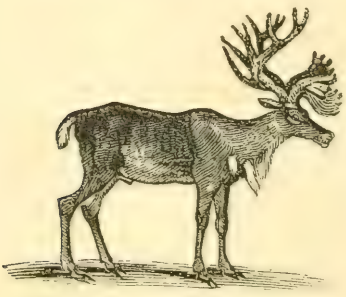
[1] *Cervus major*, Ord.

degrees. They are occasionally found in the remote and thinly settled parts of Pennsylvania, but the number is small. They are found in great numbers in the western wilds, where the forests supply them with an abundance of buds and tender twigs. The elk is shy and retiring, and has very acute senses. The moment the air is tainted by the odor of his enemy, his head is erected with spirit, his ears rapidly thrown in every direction to catch the sounds, and his dark glistening eye expresses the most eager attention. As soon as he discovers the hunter, he bounds along for a few paces, stops, turns half round, and scans his pursuer with a steady gaze, then throwing back his lofty horns, and projecting his taper nose forwards, he springs from the ground and advances with a velocity which soon leaves the object of his dread far out of sight.

The flesh of the elk is highly esteemed by the Indians and hunters as food, and the horns, while in a soft state, are also considered a delicacy; of their hides a great variety of articles of dress and usefulness are prepared. The Indians form bows of the perfect horn, which are highly serviceable, from their elasticity. These animals have been to a certain degree domesticated, and might possibly be rendered as useful as the reindeer.

The caribon or American reindeer, and the barren ground caribon, inhabit the northern parts of the continent; but are supposed to be only varieties of the Lapland reindeer.

THE REINDEER.



It appears by positive testimonies, that the reindeer formerly existed in France, at least in the high mountains, such as the Pyrenean; and, since that time, has been destroyed, like the stags, who were heretofore common in that country. It is certain, that the reindeer is now actually to be found only in the most northern countries. We also know, that the climate of France was formerly much more damp and cold, occasioned by the number

of woods and morasses, which are no longer to be seen. Gaul, under the same latitude as Canada, was, two thousand years ago, what Canada is at the present time; that is, a climate cold enough for these animals to live in. We find him in America, in the highest latitudes, because the cold is greater there than in Europe. The reindeer can bear even the most excessive cold. He is found in Spitsbergen; he is common in Greenland, and in the most northern parts of Lapland.

The reindeer is shorter and more squat than the stag; his legs are shorter and thicker, and his feet wider; the hair very thickly furnished, and his antlers much longer, and divided into a greater number of branches, with flat terminations. The reindeer is become domestic among the enlightened part of mankind. The Laplanders have no other beast. In this icy climate, which only receives the oblique rays of the sun—where there is a season of night as well as day—where the snow covers the earth from the beginning of autumn, as well as spring, and where the verdure of the summer consists in the bramble, juniper, and moss, could man form any idea but of famine? The horse, the ox, the sheep, all our useful animals, find no subsistence there, nor can they resist the rigor of the cold. He has been obliged to search among the inhabitants of the forest, for the least wild and most profitable animals. The Laplanders have done what ourselves should do: if we were to lose our cattle, we should then be obliged to tame the stag and roebucks of forests, to supply their place; and I am persuaded we should gain our point, and we should presently learn to draw as much utility from them, as the Laplanders do from the reindeer. We ought to be sensible, by this example, how far nature has extended her liberality towards us. We do not make use of all the riches which she offers us; the fund is much more immense than we imagine. She has bestowed on us the horse, the ox, the sheep, and all our other domestic animals, to serve us, to feed us, and to clothe us; and she has, besides, species in reserve which would be able to supply this defect, and which would only require us to subject them, and to make them useful to our wants.

Man does not sufficiently know what nature can do, nor what can be done with her. Instead of seeking for what he does not know, he likes better to abuse her in what he does know.

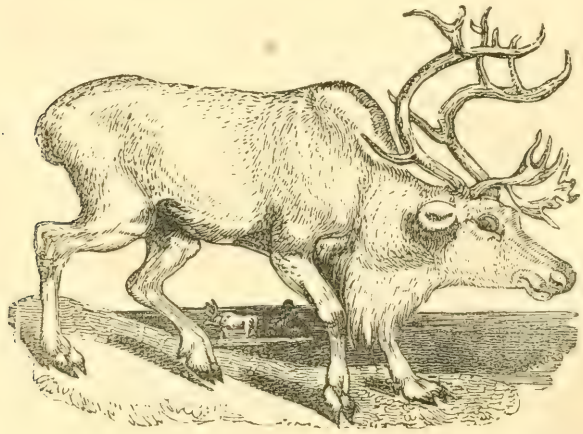
In comparing the advantages which the Laplanders derive from the tame reindeer, with those which we derive from our domestic animals, we shall see that this animal is worth two or three of them. He is used as horses are, to draw sledges and other carriages; he travels with great speed and swiftness; he easily goes a hundred miles a day, and runs with as much certainty upon the frozen snow as upon the mossy down. The female affords milk, more substantial and more nourishing than the cow; the flesh is very good to eat, the coat makes an excellent fur, and his dressed hide becomes a very supple and a very durable leather. Spoons are also made of his bones, bowstrings and thread of his tendons, and glue is manufactured from

his horns. Thus, the reindeer alone, affords all that we desire from the horse, the ox, and the sheep.

With from three to five hundred deer, a Laplander can live with tolerable comfort; with two hundred, he may, by management, contrive to get on; but with a hundred, his subsistence is precarious; and with only fifty, he must be content to be the partner, or rather servant, of some more fortunate individual.

His food, in the winter season, is a white moss, (*lichen rangiferinus,*) which he finds under the snow, and which he ploughs up with his horns, or digs up with his feet. When the snow is too deep for them to obtain this article, they resort to another lichen that hangs on pine trees; and in severe seasons the boors often cut down some thousands of these trees, to furnish subsistence to their herds.

In summer, he lives upon the buds and leaves of trees, rather than herbs, which his forward spreading antlers will not permit him to browse on, with facility. They lead them to pasture, and relead them to the stable, or shut them up in packs during the night, to shelter them from the outrages of the wolves. Many fruitless attempts have been made to introduce them into England. There is at present, however, in the Zoological Gardens, one specimen, which was placed there in 1828, and appears to be still in a thriving condition. The following figure represents this animal.



The reindeers have, outwardly, many things in common with the stags; and the formation of the interior parts is the same. The reindeer sheds his antlers every year, like the stag; and, like him, is good venison. The females, both of the one and the other species, go eight months with young, and produce but one at a birth. The young reindeer follows its mother during the first two or three years, and does not attain his growth till about

the age of four or five. It is at this age that they begin to dress and exercise them for labor. There are both wild and tame reindeer in Lapland; the wild males are more robust and stronger than the tame. The issues of this mixture are preferred for the harness. These reindeer are not so gentle as the others; for they not only sometimes refuse to obey those who guide them, but they often turn furiously upon them, and attack them with their feet, so that there is no other resource, than to cover themselves from their rage by their sledge, until the fury of the beast is subsided. This sledge is so light that they can easily manage it, and cover themselves with it. The bottom of it is lined with the skins of young reindeers; the hairy side is turned against the snow, so that the sledge glides easily forward, and recoils less on the mountains. The harness of the reindeer is only a thong of the hide, with the hairs remaining on it attached to the head, whence it descends towards the breast, passes under the belly, between the legs, and is fastened to a hole which is in the fore part of the sledge. The Laplander has only a single cord by which to guide the animal, and which he throws indifferently upon the back of the beast, sometimes on one side, sometimes on the other, according as he would direct him, to the right or left. They can travel ten miles an hour; and it is not uncommon for them to make journeys of a hundred and fifty miles in nineteen hours. At their utmost speed, and for a short time, they can accomplish near twenty miles in the hour; but the quicker the method of travelling is, the more it is inconvenient; a person must be well accustomed to it, and travel often, to be able to direct the sledge and prevent it from turning over. They can draw three hundred pounds, but the Laplanders usually limit the burthen to two hundred and forty pounds.

The reindeers are all very spirited, and very difficult to manage; they choose the liveliest and the swiftest to draw their sledges, and the more heavy, to travel with their provision and baggage, at a slower pace. These animals are troubled with an insect called the gadfly, during the summer season, which burrowing under their skins the preceding summer, deposit their eggs; so that the skin of the reindeer is often so filled with small holes, that an incurable disorder is brought on. So formidable are the attacks of these insects, that in June, July, and August, the Laplander is compelled to migrate with his deer from the forests to the mountains; without which precaution, he would run the risk of losing the major part of his herd. The reindeer are subject to elope, and voluntarily renew their natural liberty; they must be closely attended, and narrowly watched; they cannot lead them to pasture, but in open places; and in case the herd are numerous, they have need of many persons to guard them, to recall them, and to run after them if they stray. They are all marked, that they may be known again; for it often happens that they stray in the woods, or mix among another herd. In short, the Laplanders are continually occupied in the care of their reindeer, which constitute all their wealth.

The reindeer is the only animal of this species the female of which has horns like the male. Another singularity which we must not omit, and which is common to the reindeer, and the elk, is, that when these animals run or quicken their pace, their hoofs at every step make a crackling noise, as if all the joints of their legs were disjointing. It is this noise, or perhaps the scent, which informs the wolves of their approach, who run out to meet and seize them; and, if the wolves are many in number, they very often conquer. The reindeer is able to defend himself against a single wolf, not, as may be imagined with his horns, (for they are rather of a disservice to him, than of use,) but with his fore feet, which are very strong; and with which he strikes with such force, as to stun the wolf and drive him away; after which he flies with such speed, as to be no longer in any danger of being overtaken. But he finds a more dangerous, though a less frequent and less numerous enemy than the wolf, in the *rosomak*, or *glutton*.

A tame reindeer lives only to the age of fifteen or sixteen years; but it is to be presumed, that the life of the wild reindeer is of much longer duration. This animal, being four years before he arrives at his full growth, must live twenty-eight or thirty years when he is in his natural state.

The mode in which the Dog-rib Indians kill the American reindeer, is curious. The hunters go in pairs, the foremost carrying in one hand the horns and part of the skin of the head of a deer, and in the other a small bundle of twigs, against which he, from time to time, rubs the horns, imitating the gestures peculiar to that animal. His comrade follows, treading exactly in his footsteps, and holding the guns of both in a horizontal position, so that the muzzles project under the arms of him who carries the head. Both hunters have a fillet of white skin round their foreheads, and the foremost has a strip of the same round his wrists. They approach the herd by degrees, raising their legs very slowly, but setting them down somewhat suddenly, after the manner of deer, and always taking care to lift their right or left foot simultaneously. If any of the herd leave off feeding to gaze at this extraordinary phenomenon, it instantly stops and plays its part, by licking its shoulders, and performing other necessary movements. In this way the hunters attain the very centre of the herd, without exciting suspicion, and have leisure to single out the fattest. The hindmost man then pushes forward his comrade's gun, the head is dropped, and they fire at nearly the same instant. The deer scamper off, the hunters trot after them; in a short time the poor animals halt, to ascertain the cause of their terror; their foes stop at the same moment, and having loaded as they ran, greet the gazers with a second fatal discharge. The consternation of the deer increases, they run to and fro, in the utmost confusion, and sometimes a great part of the herd is destroyed in the space of a few hundred yards

THE GIRAFFE, OR CAMELOPARD[1]

Is one of the tallest, most beautiful, and most harmless animals in nature. The enormous disproportion of its legs, (the fore legs being as long again as the hinder ones,) is a great obstacle to the use of its strength. Its motion is waddling and stiff; it can neither fly from its enemies in its free state, nor serve its master in a domestic one. The species is not very numerous, and has always been confined to the central and southern parts of Africa. M. le Vaillant, the first naturalist who had an opportunity of closely examining the giraffe, gives a full and accurate description of it in his Travels. "The giraffe chews the cud, as all horned animals with cloven feet do. Like them, too, it crops the grass; though seldom, because pasture is scarce in the country which it inhabits. Its ordinary food is the leaf of a sort of mimosa, called by the natives *kaneap*, and by the planters *kamel doorn*. The tree being peculiar to the canton, and growing only there, this may be the reason why it takes up its abode in it, and why it is not seen in those regions of the south of Africa where the tree does not grow. This, however, is but a vague conjecture, and which the reports of the ancients seem to contradict.

"Its head is unquestionably the most beautiful part of its body. Its mouth is small; its eyes large and animated. Between the eyes, and above the nose, it has a very distinct and prominent tubercle. This is not a fleshy

[1] *Camelopardalis giraffa*, Desm. This is the only animal of the genus. It has eight lower and no upper incisors; no canines; six upper and six lower molars on each side. Head very long, with a bony tubercle on the forehead, and two osseous peduncles covered with skin, and hairy, terminated by a tuft of bristles; upper lip entire; no lachrymal sinuses; ears pointed; tongue rough, with corneous papillæ; eyes large; neck extremely long; withers much elevated; legs slender; a callosity on the sternum; four mammæ.

excrescence, but an enlargement of the bony part, the same as the two little bosses, or protuberances, with which its occiput is armed, and which rise as large as a hen's egg, one on each side of the mane, at its commencement. Its tongue is rough and terminates in a point. Each jaw has six grinders on each side, but the lower jaw only, has eight cutting teeth in front, while the upper jaw has none.

"The hoof is cloven, has no heel, and much resembles that of the ox. It may be observed however, at the first sight, that the hoof of the fore foot is larger than that of the hind foot. The leg is very slender; but the knee is swelled like that of a stumbling horse, because the animal kneels down to sleep. It has also a large callosity in the middle of the sternum, owing to its usually reposing on it.

"If I had never killed a giraffe, I should have thought, with many other naturalists, that its hind legs were much shorter than the fore ones. This is a mistake; they bear the same proportion to each other as is usual in quadrupeds. I say the same proportion as is usual, because in this respect there are variations, even in animals of the same species. Every one knows, for instance, that mares are lower before than stallions. What deceives us in the giraffe, and occasions this apparent difference between the legs, is the height of the withers, which may exceed that of the crupper from sixteen to twenty inches, according to the age of the animal; and which, when it is seen at a distance in motion, gives the appearance of much greater length to the fore legs.

"If the giraffe stand still, and you view it in the front, the effect is very different. As the fore part of its body is much larger than the hind part, it completely conceals the latter.

"Its gait, when it walks, is neither awkward nor unpleasing; but it is ridiculous enough when it trots; for you would then take it for a limping beast, seeing its head perched at the extremity of a long neck which never bends, swaying backwards and forwards, the neck and head playing in one piece between the shoulders as on an axis. However, as the length of the neck exceeds that of the legs at least four inches, it is evident that the length of the head too taken into the account, it can feed without difficulty, and of course is not obliged either to kneel down or to straddle with his feet, as some authors have asserted. It is, besides, unnecessary for the animal to kneel, as it feeds principally on the boughs of a species of acacia, which it draws down to its mouth with its long and flexible tongue.

"Its mode of defence, like that of the horse and other solidungulous animals, consists in kicking with the heels. But its hind parts are so light, and its jerks so rapid, that the eye cannot follow them. They are even sufficient to defend it against the lion, though they are unable to protect it from the impetuous attack of the tiger.

"Its horns are never employed in fight. I did not perceive it to use them against my dogs; and these weak and useless weapons would seem but an

error of nature, if nature could ever commit error, or fail in her designs. In their youth, the male and female giraffes resemble each other in their exterior. A knot of long hair then terminates their obtuse horns; this peculiarity the female preserves for some time, but at the age of three years the male loses it. At first, the hide is of a light red, but it deepens in color as the animal advances in age, and, at length, it is of a yellow brown in the female, and of a brown bordering on black in the male. The male may, even at a distance, be distinguished from the female by this difference of color. As to the arrangement and form of the spots, the skin varies in both sexes. The female does not stand so high as the male, and the frontal prominence is less marked. She has four teats; and, according to the account given by the natives, she has one young one at a birth, with which she goes twelve months."

Several have been carried to Europe. One was sent as a present to the King of England by the Pacha of Egypt, and arrived there in 1827. It died recently.

"In one point all the observers of the European giraffes agree—that they never make any noise whatever. Further, they appear to consider that the animal would be useless to man in a state of domestication. M. Acerbi has an anecdote illustrative of this point:—

"'When at Alexandria, I had one day ordered the two giraffes (a male and female) taken at Darfûr, to be led up and down the square in front of my house; among the crowd collected on the occasion were some Bedouins of the Desert. On inquiring of one of them whether he had ever seen similar animals before—he replied that he had not; and I then asked him in Arabic, 'Taïb di? Do they please you?' To which he rejoined, 'Mustaib,' or, 'I do not like them.' Having desired my interpreter to inquire the grounds of his disapproval, he answered, 'that it did not carry like a horse, it did not serve for field labors like an ox, did not yield hair like a camel, nor flesh and milk like a goat; and on this account it was not to his liking.'"

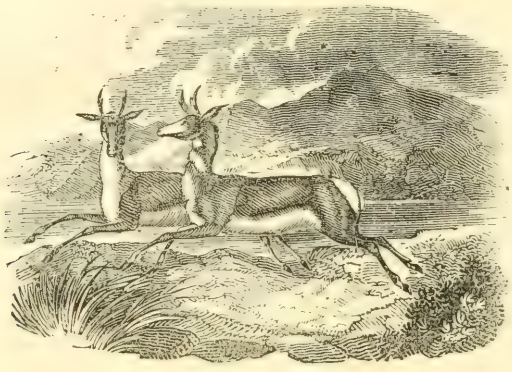
This animal, though unknown to the Greeks, is described by Pliny and Oppian, and Julius Cæsar brought one to Europe in the year of Rome 708, after which they were frequently used in the circus or triumphal processions. Its ancient denomination was *zurapha*, from which the modern name of giraffe is derived.

THE COMMON ANTELOPE.[1]

In size it is rather smaller than the fallow deer. Its color is a dusky brown, mixed with red; the belly, breast, and inside of the limbs, are white;

[1] *Antilope cervicapra*, Desm. The genus *Antilope* has eight lower and no upper incisors; no canines; twelve upper and twelve lower molars. Horns in both sexes or in the males only, covering a solid long core, round, compressed, variously inflated, and often marked by transverse annulations, or a projecting spiral ridge, sometimes bifurcated; muzzle partly naked in the greater number; often lachrymal sinuses; ears large; legs slender; two or four mammæ.

and on the head, back, and outside of the limbs, the hair is darker than on any other part; the orbits of the eyes are white, and there is a small patch of the same color on each side of the forehead; the tail is short. The horns, which are about sixteen inches long, are black, distinctly annulated almost to the top, and have three curves; the *brachia*, or sides of the lyre, were frequently made of these horns, as appears from ancient gems. The female is destitute of horns, and may also be known by a white stripe on the flanks.



The race of antelopes is famous for the concretion known by the name of *bezoar*. This word is supposed to be derived from the Arabic language, where it signifies antidote or counter-poison. It is found in the stomach and intestines of many animals, and brought over principally from the East Indies. Like all other animal concretions, it is found to have a kind of nucleus, or hard substance within, upon which the external coatings are formed; for, upon being sawn through, it seems to have layer over layer, as an onion.

This nucleus is of various kinds; sometimes the buds of a shrub, sometimes pieces of flint, stones of plums, tamarinds, seeds of cassia, and sometimes a marcasite. The stone itself varies from the size of an acorn to that of a pigeon's egg; and the larger it is, the more valuable it is reckoned—its price increasing like that of a diamond. There was a time when a stone of this kind, weighing four ounces, sold in Europe for above two hundred pounds; but at present the price is greatly fallen, and they are in very little esteem. The bezoar is of various colors, sometimes of a blood color, sometimes of a pale yellow, and of all the shades between these two. It is generally glossy, smooth, and has a fragrant smell, like that of ambergris. It has been given in vertigoes, epilepsies, palpitations of the heart, colic, and jaundice; and in those places where the dearness, and not the value of medicines, is consulted, in almost every disorder incident to man. In all cases it is perhaps equally efficacious, acting only as an absorbent

power, and possessing virtues not superior to common chalk, or crabs' claws. Judicious physicians have, therefore, discarded it: and this celebrated medicine is now chiefly consumed in countries where the knowledge of nature has been but little advanced. When this medicine was in its highest reputation, many arts were used to adulterate it; and many countries endeavored to find out a bezoar of their own.

THE SAIGA.[1]

The Scythian antelope, or saiga, is the only one of the species that is found in Europe. The general form of its body very much resembles that of the domestic goat; and, like that animal, it has a strong scent, and is fond of salt; but its horns are those of the antelope, being marked by very prominent rings, with furrows between; they are a foot in length, the tips smooth of a pale yellow color, and semi-transparent. During summer the hair is very short, and of a gray hue, mixed with yellow; the cheeks whitish, forehead and crown hoary, covered with long hairs; the under side of the neck and body white. The winter coat is long and rough; the tail about four inches long, ending with a tuft. It is equal in size to the fallow deer, and the female is destitute of horns.

These animals inhabit all the deserts from the Danube and Dnieper to the river Irtish, but not beyond; they are, therefore, found in Poland, Moldavia, about Mount Caucasus and the Caspian Sea, and in Siberia, in the dreary open deserts, where salt springs abound, feeding on the salt, and the acrid and aromatic plants of those countries. The females are in a state of gestation during the winter, and bring forth in May, in the northern deserts. They have but one at a time; and the young are covered with a soft fleece like a newly dropped lamb. They are regularly migratory; late in autumn, in the rutting season, they collect in flocks of thousands, and retire into the southern deserts; in spring they separate into little flocks, and return northward. They rarely all lie down at the same time, but by a providential instinct, some are always keeping watch; and when they are tired, they seemingly give notice to those which have taken their rest, who instantly arise and relieve the sentinels of the preceding hours; and thus they often preserve themselves from the attacks of wolves and huntsmen. They are exceedingly swift, and will outrun the fleetest horse or greyhound; yet, partly through timidity, and partly on account of the shortness of their breath, they very soon become the prey of the hunter. If they are but bitten by a dog, they instantly fall down; nor will they even offer to rise again. They are sometimes shot by the hunter; and are also taken by the

[1] *Antilope saiga*, Desm.

black eagle, which is trained for that purpose. In summer they are almost purblind, which is another cause of their destruction. This is occasioned by the heat of the sun, and the splendor of the yellow deserts, where they live in a wild state. They seem to have no voice,—yet when brought up tame, the young utter a short kind of bleating, like the sheep.

THE GAZELLE.[1]

Of all the animals in the world, the gazelle has the most beautiful eye extremely brilliant, and yet so meek, that all the eastern poets compare the eyes of their mistresses to those of this animal. The epithet of gazelle-eyed is considered the highest compliment that a lover can pay; and, indeed, the Greeks themselves thought it no inelegant piece of flattery to compare the eyes of a beautiful woman to those of a cow.

The gazelle is, for the most part, more delicately and finely limbed than even the roebuck; its hair is as short, but finer and more glossy. The hinder legs of some of the species are longer than the fore ones, as in the hare, which gives it greater security in ascending and descending steep places. In swiftness it equals, if not surpasses, the roe, running and springing with vast bounds, and leaping with surprising elasticity. It frequently stops for a moment in the midst of its course to gaze at its pursuers, and then resumes its flight. The fleetness of the antelope, indeed, was proverbial in the country it inhabited, even in the earliest times; hence the speed of Ashuel (2 Sam. ii. 18) is beautifully compared to the tzebi; and the Gradites were said to be as swift as the antelopes (translated roes) upon the mountains.

Most of these animals are brown on the back and white under the belly, with a black stripe separating those colors. Their tail is of various lengths, but in all is covered with rather long hair; and their ears are beautiful, well placed, and terminating in a point. They all have cloven hoofs, like the

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[1] *Antilope dorcas*, Lin.

sheep; horns (as before observed) hollow, curiously curved, annulated with prominent rings or spirals, and not deciduous.

They bound with such swiftness, and are generally so very shy, that dogs or men vainly attempt to pursue them. With ease and safety they traverse those precipices which, to every other quadruped, are quite impracticable; nor can some of them be overtaken by any animals but those of the winged kind. Accordingly, in those countries where the fleetest are chiefly found, they are pursued by falcons; and this admirable manner of hunting forms one of the principal amusements of the higher ranks of people all over the East. The Arabians, Persians, and Turks, employ for this purpose that kind of hawk called the *falcon gentle*, with which, when properly trained, they go forth on horseback among the forests and the mountains, the falcon perching upon the hand of the hunter. Their expedition is conducted with profound silence; their dogs are taught to keep behind, while the men, on the fleetest coursers, look round for the game. Whenever they spy a gazelle at the proper distance, they point it out to the falcon, and encourage the bird to pursue it. With the swiftness of an arrow the falcon flies to the animal, which, conscious of its danger, endeavors, but too late, to escape. The falcon soon coming up with its prey, fixes its talons, one into the animal's cheek and the other in its throat, and deeply wounds it. On the other hand, the gazelle attempts to escape, but is generally wounded too deeply to run far. The falcon clings with the utmost perseverance, nor ever leaves its prey till it falls; upon which the hunters from behind approaching, take up both, and reward the falcon with the blood of the spoil. They also teach the young birds, by applying them to the dead animal's throat, and accustoming them betimes to fix upon that particular part; for if it should happen that the falcon fixed upon any other part of the gazelle, either its back or its haunches, the animal would easily escape among the mountains, and the hunter would also lose his falcon.

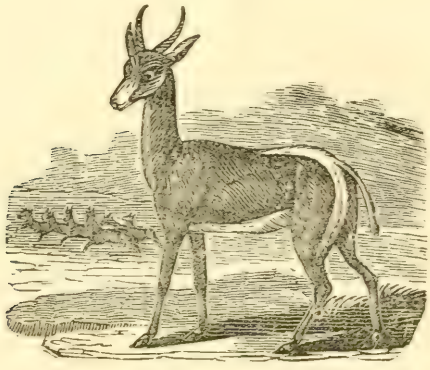
They sometimes hunt these animals with the ounce. This carnivorous and fierce creature, having been tamed and domesticated, generally sits on horseback behind the hunter, and remains there with the utmost composure, until the gazelle is shown. It is then that it exerts all its arts and fierceness; it does not at once fly at its prey, but approaches slily, turning and winding about until it comes within a proper distance, when all at once it bounds upon the animal, and instantly kills it and sucks its blood. If, on the other hand, it misses its aim, it rests in its place without attempting to pursue it any farther, seemingly ashamed of its own inability.

There is still another way of taking the gazelle, which seems not so certain nor so amusing as either of the former. A tame gazelle is trained for this purpose, which is taught to join those of its kind wherever it perceives them. When the hunter, therefore, sees a herd of these animals together, he fixes a noose round the horns of the tame gazelle in such a manner, that if the rest but touch it they are entangled; and thus prepared, he sends his

gazelle among the rest. No sooner does the tame animal approach, than the males of the herd instantly sally forth to oppose him; and in butting with their horns, are caught in the noose, when both struggling for some time, fall together to the ground; till at last the hunter comes up, disengages the one, and kills the other.

Upon the whole, however, these animals, whatever be the arts used to pursue them, are very difficult to be taken; for, as they are continually subject to alarms from carnivorous beasts, or from man, they keep chiefly in the most solitary and inaccessible places, and find their only protection from the dangerousness of the spot whither they retreat.

THE SPRINGBOK.[1]



The predominant color of this animal is a pale yellowish brown; the belly breast, and inside of the limbs, are white; as is also the head, excepting a dark brown list, which passes from each corner of the mouth, over the eyes, to the base of the horns. From the tail, half way up the back, is a stripe of white, bounded on each side by a dark brown list, and a stripe of the same color extends on each side, from the shoulders to the haunches, forming a contrasting boundary between the snowy whiteness of the belly, and the rusty color of the sides. The tail is very slender, not being thicker than a goose quill at the lower part, which reaches to nearly the first joint of the leg; the ears are of an ash color, tipped on the edges with fine light gray hairs. The hair in general is short and fine; but the dark line which borders the white consists of longer hairs, which the animal is able to expand at pleasure, to the breadth of eight or nine inches, particularly when

[1] *Antilope euchore*, Desm.

taking a leap. The height of this animal is about two feet and a half, the length of the horns, measuring them along the curvature, is nine inches; their distance at the base, where they are nearly three inches thick, is not more than one inch; and they gradually widen from thence to the distance of five inches, when they turn inwards, and nearly approach each other at the tips. They are of a deep black color, annulated above half way up, are smooth towards the top, and terminate in a sharp point.

This animal inhabits the Cape of Good Hope, and is there called the *springbock*, from the prodigious leaps it takes when any person suddenly appears. When pursued, it is pleasing and curious to see the whole herd leaping to a considerable height over each other's heads; and they will sometimes take three or four leaps successively. In this situation, they seem suspended in the air, looking over their shoulders at their pursuers. They are extremely swift, and it must be a good horse that can overtake them. They migrate annually from the interior of the country, in small herds, and continue near the Cape for two or three months, and then retreat towards the north in herds of many thousands, covering the great plains for several hours in their passage.

They are attended in these migrations, by numbers of lions, hyænas, and other wild beasts of prey, which commit great devastation among them. They also make periodical migrations, in seven or eight years, in herds of many thousands, from the north, being probably compelled to leave their haunts in the Terra de Natal, by the excessive drought of that region, where it sometimes happens that not a drop of rain falls for two or three years. In these migrations, they spread over the whole country of Caffraria, which they desolate, not leaving a blade of grass. Their flesh is excellent: and, with other antelopes, they furnish the venison of the Cape.

THE HART-BEEST, OR CAPE STAG.

This animal is supposed to be the Bubalus of the ancients, and is the most common of all the larger gazelles known in Africa. Its height to the top of the shoulders, is about four feet; the form of the body is a mixture of the stag and heifer. The tail is rather more than a foot long, asinine, and terminated by a tuft of hair; the horns are very strong, black, and embossed with rings of an irregular form: they are almost close at the base, diverging upwards, and at the top bending backwards in a horizontal direction, almost to the tips, which are distant from each other. Some of these horns are eighteen inches long, and above ten inches in girth at

[1] *Antilope caama*, Desm.

the base. The head is rather large, resembling that of an ox; and the eyes are placed very high. The general color of this animal is a dark cinnamon, except the rump and inner part of the thighs, which are white. The front of the head is marked with black, as is likewise the fore part of the legs. There is a pore about an inch below each eye, from which a matter is distilled; this the Hottentots preserve as a rare and valuable medicine.

The large head and high forehead, together with the asinine ears and tail of this animal, render it less handsome than many of the tribe of antelopes. They associate in great herds; and although they seemingly gallop with a heavy pace, yet they run as fast as any of the larger kinds; and when they have once got ahead of their pursuers, they are very apt to turn round and gaze at them. Like the wood antelope and nyl-ghau, this animal drops on its knees to fight. The flesh is fine, and of an agreeable flavor, but dry.

THE NYL-GHAU.[1]

Most of these interesting animals, which have been brought to England, have been obtained from Surat or Bombay; and it is conjectured that they are indigenous in the province of Guzerat. The nyl-ghau is larger than any ruminant of that country, except the ox, it being of greater size than the deer, and rather smaller than the black cattle; and in its form there is a very evident mixture of both. Its horns are seven inches long, six inches round at the roots, tapering by degrees, and terminating in a blunt point, the ears are large and beautiful, and spread to a considerable breadth: they

[1] *Antilope picta*, Desm. *Nyl ghau*, the Persian name of this animal, signifies *blue cow*.

are white on the edge and on the inside, except where two black bands mark the hollow of the ear with a zebra-like variety. The general color of the animal is ash or gray, from a mixture of black hairs and white, most of which are half white towards the root, and half black. Along the ridge of the neck and the back, the hairs form a short and thin upright mane; at the throat is a shield-like mark of beautiful hair; and lower down, on the beginning of the convexity of the neck, there is a remarkable tuft of long black hair. The height of the animal is about four feet one inch at the shoulder. The female differs from the male both in height and thickness, she being much smaller, and in shape more resembling the deer, and having no horns.

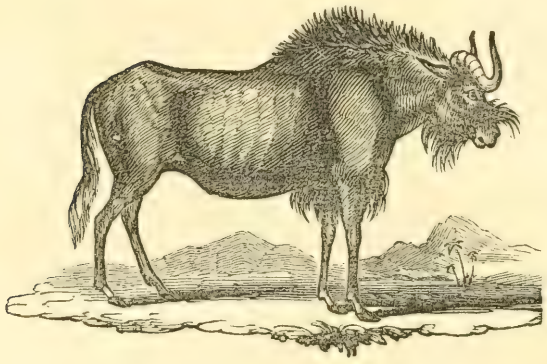
The nyl-ghau has six grinders in each jaw, and eight cutting teeth in the lower one. It eats oats, is fond of grass and hay, and still fonder of wheaten bread; when thirsty, it will drink two gallons of water. It is vicious and fierce in the rutting season, but tame and gentle at other times; and should it prove docile enough to be easily trained to labor, its great swiftness and considerable strength might be applied to valuable purposes, as it is evident from experience, that it will breed in this country. When the males fight, they prepare for the attack at a distance from each other, by falling down

upon their knees; and in this attitude they approach, and when they are sufficiently near, spring and dart at each other with great violence.

In a state of confinement they often fall into that posture without doing any mischief. They will, notwithstanding, attack mankind unprovoked. A laborer, who was looking over some pales which inclosed several of them, was alarmed by one of them flying at him with the quickness of lightning; but the wood-work which separated him from the animal, was the means of his safety, as it dashed it to pieces and broke off one of its horns close to the root. The death of the animal, which happened soon after, was supposed to be owing to the injury it received from the blow.

In the days of Aurungzebe, they abounded between Delhi and Lahore, on the way to Cachemir; and they were once objects of chase with that mighty prince, during his journey. They were inclosed in nets by his army of hunters, which, being drawn closer and closer, at length formed a small space; into this the king, his omrahs, and hunters, entered, and killed the animals with arrows, spears, or muskets; and sometimes in such numbers, that Aurungzebe used to send quarters as presents to all his great people, which proves that they are esteemed as good and delicious food.

THE GNU.[1]



The gnu is one of the swiftest beasts that ranges the plains of Africa. Mr Barrows says, "The various descriptions that have been given of it, all differing from each other, should seem to have been taken from report rather than from nature, notwithstanding that one of them was for some time in

[1] *Antilope gnu*, Gmel.

the menagerie of the Prince of Orange, at the Hague. Nature, though regular and systematic in all her works, often puzzles and perplexes human systems, of which this animal affords an instance. In the shape of its body it evidently partakes of the horse, the ox, the stag, and the antelope.

"Its head is about eighteen inches long, the upper part completely guarded by the rugged roots of the horns, that spread across the forehead, leaving only a narrow channel between them, that wears out with age, as in the instance of the buffalo; the horns project forward twelve inches, then turn in a short curve, backwards, ten inches: the space from the root to the point is only nine inches. Down the middle of the face grows a sort of black hair four inches in length; and from the under lip to the throat another ridge somewhat longer. The orbit of the eye is round, and surrounded by long white hairs, that, like so many radii, diverge and form a kind of star; this radiated eye gives to the animal a fierce and uncommon look. The same sort of vibrissæ is thinly dispersed over the lips. The neck is little more than a foot long; on the upper part is a mane extending beyond the shoulders, erect, and five inches in length; the hair like bristles, black in the middle, and white on each side. This mane appears as if it had been cut and trimmed with nice attention. A ridge of black hair, from six inches to a foot in length, extends from the fore part of the chest, under the fore legs, to the beginning of the abdomen. The body is about three feet two inches long. The joints of the hip bones project high, and form on the haunches a pair of hemispheres. The tail is two feet long, flat near the root, where the hair grows only at the sides; this is white, bristly, and bushy. The entire length, from the point of the nose to the end of the tail, is seven feet ten inches; and the height three feet six inches. The color is that of a mouse, with a few ferruginous straggling hairs on the sides. Like the mare, it has only two teats; and all its motions and habits are equine. Though a small animal, it appears of considerable size when prancing over the plains. The gnu might be considered as an emblem of unbounded freedom, with the means of supporting it. It possesses, in an eminent degree, strength, swiftness, weapons of defence, acute scent, and a quick sight. When they happen to be disturbed, the whole herd begin to draw together, and to butt each other with their horns, to bound, and play their various gambols, after which they gallop off to a distance. Their motions are extremely free, varied, and always elegant. Fierce and vicious as this animal certainly is in its wild state, yet it probably might not be very difficult of domestication. No successful attempts, however, have yet been made to tame it. The flesh is so like that of an ox, both in appearance and taste, that it is not to be distinguished from it."

There is another variety of the gnu, a male and female of which were exhibited at Cross's menagerie, in Pall-Mall East; and in their appearance, partook rather more of the antelope tribe than the preceding. Mr Pringle, who had seen this variety in its native regions, observes, "that

the gnu forms a graceful link between the buffalo and the antelope; possessing the distinct features which, according to naturalists, are peculiar to the latter tribe. The gnu exhibits at the same time, in his general aspect, figure, motions, and even the texture and taste of his flesh, qualities which partake very strongly of the bovine character. Among other peculiarities, I observed, that, like the buffalo or the ox, he is strangely affected by the sight of scarlet; and it was one of our amusements, when approaching these animals, to hoist a red handkerchief on a pole and to observe them caper about, lashing their flanks with their long tails, and tearing up the ground with their hoofs, as if they were violently excited, and ready to rush down upon us; and then, all at once, when we were about to fire upon them, to see them bound away, and again go prancing round at a safer distance. When wounded, they are reported to be sometimes rather dangerous to the huntsman; but though we shot several at different times, I never witnessed any instance of this. On one occasion, a young one, apparently only a week or two old, whose mother had been shot, followed the huntsmen home, and I attempted to rear it on cow's milk. In a few days it appeared quite as tame as a common calf, and seemed to be thriving; but afterwards, from some unknown cause, it sickened and died. I heard, however, of more than one instance in that part of the colony, where the gnu, thus caught young, had been reared with domestic cattle, and had become so tame as to go regularly out to pasture with the herds, without exhibiting any inclination to resume its natural freedom; but, in consequence of a tendency which the farmers say they evinced to catch, and to communicate to the cattle a dangerous infection, the practice of rearing them as curiosities has been abandoned."

THE CHAMOIS[1]

Is of a fawn color in summer and brown in winter; a dark line passes through each eye. Its horns are seven or eight inches long, and hooked at

[1] *Antilope rupicapra.*

the end; the tail is short. This animal inhabits the mountains of Switzerland. It is about the size of a domestic goat, and resembles one in many respects. It is most agreeably lively, and active beyond expression. Its hair is short, like that of the doe.

The young follows the dam for about five months, and sometimes longer if the hunters or the wolves do not separate them. It is asserted that they live between twenty and thirty years. The flesh of the chamois is good to eat; and some of the fattest afford ten or twelve pounds of suet, which far surpasses that of the goat in solidity and goodness.

The cry of the chamois is not distinctly known; if it has any, it is but faint, and resembling that of a hoarse goat. When they are frightened, or are in danger of any enemy, or some other object not perfectly known to them, they warn the rest of the flock by a kind of hissing noise. It is observable, that the chamois has a very penetrating eye, and its hearing and smell are not less distinguishing. When it finds an enemy near, it stops for a moment, and then in an instant flies off with the utmost speed. When the wind is in its favor, it can smell a human creature for more than half a mile distance. When this happens, therefore, and it cannot see its enemy, but only discovers his approach by the scent, it begins the hissing noise with such force, that the rocks and the forests re-echo with the sound. This hissing continues as long as the breath will permit. In the beginning it is very shrill, and deeper towards the close. This animal then rests a moment, after this alarm, to inspect further into its danger; and, having confirmed the reality of its suspicion, it commences to hiss by intervals, till it has spread the alarm to a great distance. During this time, it is in the most violent agitation, strikes the ground forcibly with its fore foot, and sometimes with both. It bounds from rock to rock; it turns, and looks round; it turns to the edge of the precipice, and when it has obtained a sight of the enemy, flies from it with all its speed. The hissing of the male is much more acute than that of the female; it is performed through the nostrils, and is, properly, no more than a very strong breath, forced through the nostrils by fixing the tongue to the palate, keeping the teeth nearly shut, the lips open, and a little lengthened. Their agility is wonderful, as they will throw themselves down, across a rock, which is nearly perpendicular, and twenty or thirty feet in height, without a single prop to support their feet. Their motion has, indeed, rather the appearance of flying than of leaping. The chamois feeds upon the best herbage, and chooses the most delicate parts of plants, flowers, and the most tender buds. It is not less delicate with regard to several aromatic herbs, which grow upon the sides of the Alps. It drinks but very little while it feeds upon the succulent herbage, and ruminates, like the goat, in the intervals of feeding. Its head is crowned with two small horns, of about half a foot long, of a beautiful black, and rising from the forehead, almost betwixt the eyes. These horns are often made use

of for the heads of canes. The hides of these animals are very strong and supple, and good warm waistcoats and gloves are made of them.

The hunting of the chamois is very laborious, and extremely difficult and perilous. It is thus admirably described by Saussure:—"The chamois hunter sets out upon his expedition of fatigue and danger generally in the night. His object is to find himself, at the break of day, in the most elevated pastures, where the chamois comes to feed before the flocks shall have arrived there. The chamois feeds only at morning and at evening. When the hunter has nearly reached the spot where he expects to find his prey, he reconnoitres with a telescope. If he find not the chamois, he mounts still higher; but if he discovers him, he endeavors to climb above him and to get nearer, by passing round some ravine, or gliding behind some eminence or rock. When he is near enough to distinguish the horns of the animal, (which are small, round, pointed, and bent backward like a hook, as in the wood cut,) he rests his rifle upon a rock, and takes his aim with great coolness. He rarely misses. This rifle is often double-barrelled. If the chamois falls, the hunter runs to his prey—makes sure of him by cutting the hamstrings—and applies himself to consider by what way he may best regain his village. If the route is very difficult, he contents himself with skinning the chamois; but if the way is at all practicable with a load, he throws the animal over his shoulder, and bears it home to his family, undaunted by the distance he has to go, and the precipices he has to cross.

"But when, as is more frequently the case, the vigilant animal perceives the hunter, he flies with the greatest swiftness into the glaciers, leaping with incredible speed over the frozen snows and pointed rocks. It is particularly difficult to approach the chamois when there are many together. The sentinel, who is placed on the point of some rock which commands all the avenues of their pasturage, makes the sharp hissing sound already mentioned; at the sound of which all the rest run towards him, to judge for themselves of the nature of the danger. If they discover a beast of prey or a hunter, the most experienced puts himself at their head, and they bound along, one after the other, into the most inaccessible places.

"It is then that the labors of the hunter commence; for then, carried away by the excitement, he knows no danger. He crosses the snows, without thinking of the abysses which they may cover; he plunges into the most dangerous passes of the mountains; he climbs up; he leaps from rock to rock, without considering how he can return. The night often finds him in the heat of the pursuit; but he does not give it up for this obstacle. He considers that the chamois will stop during the darkness, as well as himself, and that on the morrow he may again reach them. He passes, then, the night—not at the foot of a tree, nor in a cave covered with verdure, as does the hunter of the plain—but upon a naked rock, or upon a heap of rough stones, without any sort of shelter. He is alone, without fire, without

light. But he takes from his bag a bit of cheese and some of the barley bread, which is his ordinary food—bread so hard that he is obliged to break it between two stones, or to cleave it with the axe, which he always carries with him to cut steps which shall serve for his ladder up the rocks of ice. His frugal meal being soon ended, he puts a stone under his head, and is presently asleep, dreaming of the way the chamois has taken. He is awakened by the freshness of the morning air; he rises, pierced through with cold; he measures with his eye the precipices he must yet climb to reach the chamois; he drinks a little brandy, (of which he always carries a small provision,) throws his bag across his shoulder, and again rushes forward to encounter new dangers. These daring and persevering hunters often remain whole days in the dreariest solitudes of the glaciers of Chamouni; and, during this time, their families, and, above all, their unhappy wives, feel the keenest alarm for their safety.

"And yet, with the full knowledge of the dangers to be encountered, the chase of the chamois is the object of an insurmountable passion. Saussure knew a handsome young man, of the district of Chamouni, who was about to be married; and the adventurous hunter thus addressed the naturalist:—'My grandfather was killed in the chase of the chamois; my father was killed also; and I am so certain that I shall be killed myself, that I call this bag, which I always carry hunting, my winding-sheet. I am sure that I shall have no other; and yet, if you were to offer to make my fortune, upon the condition that I should renounce the chase of the chamois, I should refuse your kindness.' Saussure adds, that he went several journeys in the Alps with this young man; that he possessed astonishing skill and strength, but that his temerity was greater than either; and that, two years afterwards, he met the fate which he had anticipated, by his foot failing on the brink of a precipice to which he had leaped.

"The very few individuals of those who grow old in this trade, bear on their countenances the traces of the life which they have led. They have a wild, and somewhat haggard and desperate air, by which they may be recognized in the midst of a crowd. Many of the superstitious peasants believe that they are sorcerers; that they have commerce with the evil spirit; and that it is he that throws them over the precipices"

THE IBEX[1]

Or wild goat, exactly resembles the domestic goat, in the conformation, the organization, and the natural and physical habits. It only varies by

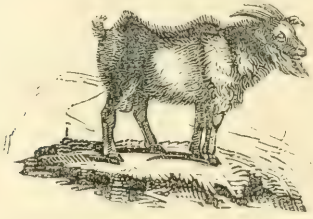
[1] *Capra ibex*, Lin. The genus *Capra* has eight lower and no upper incisors; no canines; twelve upper and twelve lower molars. Horns common to both sexes, directed upwards and backwards, striated transversely; no muzzle; interval between the nostrils naked; no lachrymal sinus or inguinal pores; ears pointed; legs robust; tail short; chin bearded.

two slight differences, the one externally, and the other internally. The horns of the ibex are longer than those of the he-goat; they have two longitudinal ridges, those of the goat have but one. They have also thick knots, or transverse tubercles, which mark the number of years of their growth; while those of the goats are only marked with transverse strokes. The ibex runs as fast as the stag, and leaps lighter than the roebuck. They are liable to vertigos, which are common to them with the chamois, as well as the inclination to climb up rocks; and still another custom, which is that of continually licking the stones, especially those which are strongly impregnated with salt-petre, or common salt. In the Alps, there are rocks which have been hollowed by the tongue of the chamois. These are commonly soft and calcinable stones, in which, as is well known, there is always a certain quantity of nitre.

The male ibex differs from the chamois, by the length, the thickness, and the form of the horns; it is also much more bulky, vigorous, and strong. The female ibex has horns different from the male; they are also much smaller, and nearly resembling those of the chamois. In other respects, these two animals have the same customs, the same manners, and the same country; only the ibex, as he is endowed with more agility, and is stronger than the chamois, climbs to the summit of the highest mountains, while the chamois only lives in the second stage; but neither the one nor the other is to be found in the plains. Both make their way on the snow; both ascend precipices by bounding from rock to rock; both are covered with a firm and a solid skin, and clothed, in winter, with a double fur, with very rough hair outwardly, and a finer and thicker hair underneath. Both of

them have a black stripe on the back, and both, likewise, have a tail nearly of the same size. The number of exterior resemblances is so great, in comparison with the differences, and the conformity of the exterior parts is so complete, that if we reason in consequence of these accounts, we might be led to believe, that these two animals are not really of a different species, but that they are simply only constant varieties of one and the same species. The ibex, as well as the chamois, when taken young and brought up with domestic goats, is easily tamed; and, accustomed to domesticity, imbibe the same manners, and herd together. The animal is five feet in length, and inhabits the Alps, Pyrenees, and other mountains in Europe.

THE DOMESTIC GOAT.[1]



Although the goat is a distinct species, and perhaps more distant from that of the sheep than the species of the ass is from that of the horse, yet goats will willingly couple with sheep, as the ass with the mare, and are sometimes prolific; but they have never introduced any intermediate species between the goat and the sheep. These two species are distinct, remaining constantly separated, and always at the same distance from each other, and have never been changed by this mixture, or produced any new stock, or new breed of intermediate animals; for they have, at most, only produced different individuals, which has no influence on the unity of each primitive species, and which, on the contrary, confirms the reality of their different characteristics.

The goat has naturally more understanding, and can shift better for herself than the sheep; she comes voluntarily, and is easily familiarized; she is sensible of caresses, and capable of attachment; she is also stronger, lighter, more agile, and less timid than the sheep; she is lively, capricious, and lascivious.

Goats are fond of straying in solitary places, are fond of climbing up steep places, sleeping on the tops of rocks, and on the brink of precipices. They leap with ease and security among the most dreadful precipices; and

[1] *Capra hircus*, Lin.

even when two of them are linked together, they will leap in such perfect concert as to reach in safety the desired spot.

The inconstancy of this animal's nature is shown by the irregularity of her actions. She walks, stops short, runs, jumps, advances, retreats, shows, then hides herself, or flies; and this all from caprice, or without any other determinate cause than her whimsical vivacity. And all the suppleness of the organs, all the nerves of the body, are scarcely sufficient for the petulance and rapidity of these motions, which are all natural to her.

That these animals are naturally fond of mankind, and that in uninhabited places they do not become wild, the following anecdote serves to confirm. In 1698, an English vessel having put into harbor at the island of Bonavista, two negroes presented themselves on board, and offered the English as many goats as they chose to carry away. On the captain manifesting a degree of surprise at this offer, the negroes observed there were but twelve persons in all the island; that the goats multiplied so fast, that they became troublesome; and that, far from having any difficulty in taking them, they followed them with a kind of obstinacy, like domestic animals.

Goats go five months with young, and bring forth at the beginning of the sixth month; they suckle the young ones for about a month or five weeks; so that it may be reckoned about six-and-twenty weeks from the time of their coupling till the time that the young kid begins to eat. The goat generally produces one kid, sometimes two, very rarely three, and never more than four; and she brings forth young, from a year or eighteen months, to seven years. The knobs in the horns, and their teeth, ascertain their age. The number of teeth is not always the same in female goats; but they have usually fewer than the male goat, which has also the hair rougher, and the beard and the horns longer. These animals, like oxen and sheep, have four stomachs, and chew the cud. This species is more diffused than the sheep, and goats, like the European, are found in several parts of the world; only in Guinea and other warm countries they are smaller, but in Muscovy and other cold climates they are larger.

ROCKY MOUNTAIN GOAT.[1]

This animal inhabits the most lofty peaks of the Rocky Mountains, seldom descending so near the low country as the Rocky Mountain sheep Their manners are said to resemble greatly those of the domestic goat. The exact limits of the range of this animal have not been ascertained, but it probably extends from the fortieth to the sixty-fourth, or sixty-fifth

[1] *Capra montana*, Ord.

degree of latitude. It is common on the elevated part of the range that gives origin to the Mackenzie, Columbia, Nelson, and Missouri rivers. The fine wool which the animal produces, grows principally on the back and hips, and is intermixed with long coarse hair. From the circumstance of its bearing wool, it has occasionally been termed a sheep by the voyagers,

and even by naturalists. Some little confusion has, therefore, crept into the accounts of its habits, which have been published from the reports of traders. Its flesh is hard and dry, and is little esteemed. The Indians make caps and saddles of its skin. The Hudson's Bay company have very lately presented a perfect specimen of the goat to the Zoological Society. This animal is of the size of the domestic sheep, and is totally white, except the horns, hoofs, lips, and margins of the nostrils. The horns are black and shining.

THE ANGORA GOAT

Is found in Natolia in Asia Minor. It is distinguished from the European goat, by the greater size of its ears, though it is only a variety of the same species; they mix and produce together, even in our climate. The males have horns almost as long as the common goat, but the circumference and directions are very different, and they are of a dazzling white color; they are extended horizontally on each side of the head, and form spirals, some-

what like a worm. The horns of the female are short, and first turn round backwards, then bend down, and turn round before, so much, that they end near the eyes; and in some their circumference and direction vary. The male and female goat of Angora, which we have seen, are such as we have

described. These goats, like all the animals of Syria, have the hair very long and thick, and so fine that stuffs have been made of it, almost as handsome and glossy as our silks. It is, in fact, what is commonly termed *mohair*. The stuffs made from the hair of this goat are known by the name of *camlet*.

ROCKY MOUNTAIN SHEEP[1]

Inhabit the lofty chain of mountains from whence they derive their name; from its northern termination in latitude sixty-eight, to about latitude forty degrees, and most likely still further south. They also frequent the elevated and craggy ridges with which the country between the great mountain range and the Pacific is intersected; but they do not appear to have advanced further to the eastward than to the declivity of the Rocky Mountains, nor are they found in any of the hilly tracts nearer to Hudson's Bay. They collect in flocks, consisting of from three to thirty, the young rams and females herding together during the winter and spring, while the old rams form separate flocks. The ewes bring forth in June or July, and then retire with

[1] *Ovis montana*, Geoff. The genus *Ovis* has eight lower incisors; no canines; twelve upper and twelve lower molars. Horns common to both sexes; sometimes wanting in the female, thick, angular, wrinkled transversely, pale colored, turned laterally in a spiral form; ears small; legs slender; hair of two kinds; tail more or less short; two mammæ.

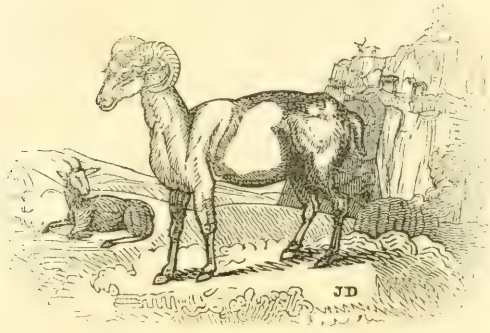
their lambs to the most inaccessible heights. Mr Drummond informs us, that in the retired parts of the mountains, where the hunters had seldom penetrated, he found no difficulty in approaching the Rocky Mountain sheep, which there exhibited the simplicity of character so remarkable in the domestic species; but that where they had been often fired at, they were exceedingly wild, alarmed their companions on the approach of danger by a hissing noise, and scaled the rocks with a speed and agility that baffled pursuit. He lost several that he had mortally wounded, by their retiring to die amongst the secluded precipices.

Their favorite feeding places, are grassy knolls, skirted by craggy rocks to which they can retreat, when pursued by dogs or wolves. They are accustomed to pay daily visits to certain caves in the mountains, that are encrusted with a saline efflorescence, of which they are fond. These caves are situated in slaty rocks. Mr Drummond says, that the horns of the old rams attain a size so enormous, and curve so much forwards and downwards, that they effectually prevent the animal from feeding on level ground. Its flesh is said by those who have fed on it, to be quite delicious when it is in season, far superior to that of any of the deer species which frequent the same quarter, and even exceeding in flavor the finest English mutton.

The missionaries who first discovered the Rocky Mountain sheep, describe it correctly as possessing the hair and the horns of the ram; and M. Geoffroy has also briefly characterized it as having the head of sheep, with the body

of a deer. Several naturalists of eminence have considered it as forming but one species with the argali; and Cuvier supposes that it may have crossed Bhering's Straits on the ice. It resembles the argali indeed, perfectly in its manners, in the form of its body, and in the nature and color of its hairy coat; but it seems to be a larger animal, and to present a constant difference in the form of curvature in its horns.

THE ARGALI, OR WILD SHEEP,[1]



Is an inhabitant of rocky and mountainous regions, and is principally found in the Alpine parts of Asia. Dr Pallas observed this species existing throughout the vast chain of mountains extending through the middle of that continent to the Eastern Sea.

These animals have large horns, arched semicircularly backward, and divergent at their tips, wrinkled on their upper surface, and flattened beneath; on the neck are two pendant hairy dewlaps. This creature is about the size of the fallow deer. It is of a gray ferruginous brown color above, and whitish beneath. The face is also of a whitish hue; and behind each of the shoulders a dusky patch or spot is often discovered. In the European variety, the legs are generally white. The head exhibits much resemblance to the ram; but the ears are considerably smaller in proportion to its size. The body is large; but the neck and legs are slender, and the latter are very strong. The tail is very short, being seldom more that three inches in length. The horns in the adult, or full grown animal, have much the appearance of those of the common ram. This animal has hair instead of wool, thus greatly differing from the general aspect of the sheep; but the face, in winter, and especially that part about the tip of the nose, becomes whiter; the back is of a more ferruginous cast: and the hair, which is close

[1] *Ovis ammon*, Lin.

in summer, like the deer, becomes somewhat wavy, a little curled, and rough, consisting of a kind of wool intermixed with hair, and its roots concealed by a fine woolly down. About the neck and shoulders, as well as under the throat, the hair is considerably longer than elsewhere. The female is much less than the male, and her horns neither so much curved nor so large as those of the ram.

From spring to autumn the argalis feed in the little valleys among the upper regions of the mountains, on the young shoots of the Alpine plants, and are said to grow very fat. As winter approaches, they descend lower, and eat grass and other vegetables. They are fond of frequenting spots of a saline nature, and will excavate the ground in such places in order to get at the salt.

In Siberia, the argali is chiefly found on the summits of the highest mountains, exposed to the sun, and free from woods. They generally travel in small flocks; and seldom produce more than one, or sometimes two, at a birth. The young lamb, when first born, is covered with a soft, gray, curling fleece, which gradually changes into hair towards the end of summer.

These animals are very timid; and when closely pursued, they turn and double like a hare, and do not run in a progressive course. They ascend rocky mountains with great agility, passing over the narrowest and most dangerous places with perfect safety, like the wild goat.

The males are said to fight frequently, and often precipitate each other down the rocks in their contests. The chase of these creatures is extremely dangerous and difficult, but is a most important object with some of the Asiatics, as this sheep supplies them with a great number of valuable and necessary articles; the skin being used for clothing, and the flesh as food. Pallas informs us, that "the flesh of the lamb is excellent; that of the old animals is good; but more particularly when roasted."

The horns of the argali grow to a vast size, and some have been found to measure in their convolutions above two ells in length, and to weigh fifteen pounds each. Sometimes they are found broken off in such a manner that the small animals of the forest creep into the cavity for shelter

THE CORSICAN ARGALI,[1]

Or *Mouflon* of Buffon, is of a much darker color than the Asiatic. It is so extremely wild, as to be seldom taken alive. However, it is shot by the hunters, who lie in ambush for it among the recesses in the mountains. Like many other animals, the young ones, which are often taken when the parent has been destroyed, are very easily tamed The various kinds of domestic sheep are all supposed to have sprung originally from the argali.

[1] *Ovis musimon*, Pall.

THE DOMESTIC SHEEP.[1]

Our domestic sheep is only to be met with in Europe, and some of the most temperate provinces of Asia and America, and if transported into Guinea, loses its wool, and is covered with hair. It increases there but little, and its flesh has no longer the same taste; it cannot also subsist in cold countries.

In Iceland, a breed of sheep is to be found, who have many horns, short tails, harsh and thick wool, under which, as in almost every animal in the north, is a second lining of a softer, finer, and thicker wool. These animals are sometimes wintered in stables, but are generally left to provide for themselves in the open plains. Caves are their retreats in stormy weather; but when they cannot reach such places of shelter, and are involved in falls of snow, they place their heads near each other, with their muzzles downward towards the ground. In this situation, they will remain for several days, and hunger will sometimes compel them to gnaw each other's wool. They yield from two to six quarts of milk a day. Their wool is not shorn, but loosens of itself, about the end of May, and is then stripped off at once, like a skin.

In warm climates, some are covered with wool, others with hair, and a third kind with hair mixed with wool. The first kind of sheep of those countries, is that commonly called the Barbary or Arabian sheep, which entirely resembles the tame kind, excepting in the tail, which is very much loaded with fat, is often more than a foot broad, and weighs upwards of twenty pounds. As for external appearance, this sheep has nothing remarkable but the tail, which he carries as if a pillow was fastened to his hinder parts. Among this kind of broad tailed sheep, there are some whose tails are so long and heavy, that the shepherds are obliged to fasten a small board with wheels, in order to support them as they walk along. This tail, which is a substance between marrow and fat, is considered a great delicacy. In the Levant, these sheep are clothed with a very fine wool. In the hotter

[1] *Ovis aries*, Desm.

countries, as Madagascar and India, they are clothed with hair. The superabundance of fat, which in our sheep fixes upon the reins, in these sheep descends under the vertebræ of the tail; the other parts of the body are less charged with it than in our fat sheep. This variety is to be attributed to the climate, the food, and the care of mankind; for these broad, or long tailed sheep, are tame, like those of our country, and they even demand much more care and management. This breed is much more dispersed than ours; they are commonly met with in Tartary, Thibet, Turkey, Persia, Syria, Egypt, Barbary, Ethiopia, and Madagascar; and even as far as the Cape of Good Hope. In Thibet, their fleeces, which are very fine, are manufactured into shawls.

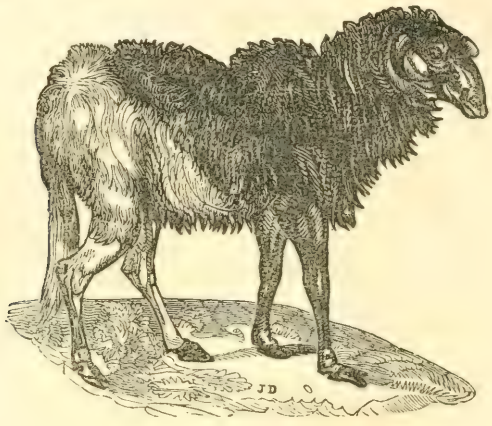
In the islands of the Archipelago, and chiefly in the island of Candia, there is a breed of sheep, of which Belon has given the figure and description, under the name of *strepsiceros*. This sheep is of the make of our common sheep. It is like that, clothed with wool; and only differs from it by the horns, which are larger and rise upwards, but are twisted into spirals. The distance between the horns of the ewe enlarges towards their

tops; those of the ram are parallel. This animal, which is commonly called the *Wallachian sheep*, is frequent in Austria and Hungary, where its name is zackl.

In the hottest countries of Africa and India, there is a breed of large sheep, which has rough hair, short horns, hanging ears, and a kind of tuft under the tail. Leo Africanus, and Marmol, call it *adamain;* and it is known to the naturalists by the name of the Senegal ram, the Guinea ram, and the Angola sheep, &c. He is tame, like ours; and, like him, subject to variety. These, though different in themselves by particular characters, resemble each other so much in other respects, that we can scarcely doubt that they are of the same kind.

A specimen of the male *African sheep*, is now in the Tower menagerie, to which it was presented by Lord Liverpool. In temper, it is extremely mild; but it is an uncouth looking creature. It is high on the legs, narrow in the loins, and its coat is rough and shaggy. Its horns are remarkably

small, and within their curve the ears are inclosed. Whenever the ears escape from this seeming confinement, the animal exhibits much uneasiness; and difficult as it is for him to replace them, he never rests till it is accomplished. On his back and sides he is nearly black; the shoulders are



of a reddish brown; the posterior part of the body, the haunches, the hind legs, the tail, the nose, and also the ears, which are rather large, are white. There is likewise a white spot over each eye.

One of the curious modifications produced by cultivation, in the domestic sheep, consists in the augmentation of the number of its horns; two, three, or even four supplementary appendages of this description, being occasionally procured in addition to the usual number. Under these circumstances, the additional horns usually occupy the upper and fore part of the head, and are of a more slender shape, and take a more upright direction than the others; thus approaching in character to those of the goats, while the true horns retain more or less of the spiral curve that distinguishes those of the sheep. There exists a strong tendency to the hereditary propagation of this monstrosity, which is extremely frequent in the Asiatic races, but is also met with in a breed that is common in the north of Europe, and is said to have been originally derived from Iceland, and the Feroe islands. In the latter case, it is unconnected with any other anomaly; but in the flocks of the nomad hordes of Tartary, it is usually combined with an enlargement of the tail and adjacent parts, by the deposition of fat, frequently to an enormous extent. Specimens of both varieties, separate and combined, have formed part of the Society's collection at the farm on Kingston Hill, to which most of the domesticated animals were removed during the summer of 1829.

The specimen figured below, is remarkable only for the number of its horns. The lateral, or true horns, rise from their usual point of attachment, and describe a spiral curve round the animal's ears. The accessory

horns, two in number, take their origin more internally, and between the others, and pass almost directly upwards, inclining, as they advance, in a direction forwards and outwards.

THE CAPE BUFFALO.[1]

This animal is called by the Hottentots, *quaraho*. It has dark and rugous horns, spreading horizontally over the summit of the head, in the shape of a scalp, with the beams bent down laterally, and the points turned up. The animal is about nine feet in length, with a deep brown fur. They live in small herds in brushwood, and open forests, in Caffraria, occasionally uniting in droves upon the plains. They are excited to madness by the sight of red colors, and swim with great force. Since the settlement of the Cape of Good Hope, they have become scarce in that neighborhood.

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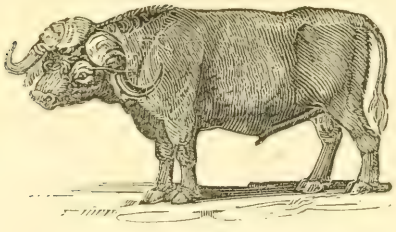
[1] *Bos caffer*, Desm. The genus *Bos* has eight lower incisors; no canines; twelve upper and twelve lower molars. Body members strong; head large; forehead straight; muzzle square; eyes large; ears generally funnel shaped; a fold of the skin or dewlap on the under side of the neck; four mammæ; tail long and tufted; horns simple, conical, round, with different inflections, but often directed laterally, and the points raised.

THE ARNEE.[1]

This animal, which is an inhabitant of various parts of India, north of Bengal, far exceeds in size any of the cattle tribe that has hitherto been discovered; it being from twelve to fifteeen feet in height. The horns, which are full two feet in length, are erect and semilunar, flattened, and annularly wrinkled, with smooth, round, approaching points. The arnee is seldom seen within the European settlements; but a very young one was picked up alive, in the Ganges, some years ago, which was as big as an immensely large bullock, and weighed nearly three quarters of a ton. A British officer, who found one in the woods in the country above Bengal, describes it as a bold and daring animal, and its form as seeming to partake of the horse, the bull, and the deer. Some of the native princes are said to keep arnees for parade, under the name of fighting bullocks.

THE DOMESTIC BUFFALO.[2]



The buffalo and the ox, although greatly resembling each other, both tame, and often living under the same roof, and fed in the same meadows; yet, when brought together, and even excited by their keepers, have ever refused to unite and couple together. Their nature is more distant than that of the ass is from the horse; there even appears to be a strong antipathy between them: for it is affirmed, that cows will not suckle the young buffalos; and the female buffalo refuses the same kindness to the other's calves. The buffalo is of a more obstinate nature, and less tractable than the ox; he obeys with great reluctance, and his temper is more coarse and brutal. Like the hog, he is one of the filthiest of the tame animals, as he shows by his unwillingness to be cleaned and dressed; his figure is very clumsy, and forbidding; his looks stupidly wild; he carries his tail in an

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[1] *Bos arnee*, Shaw. [2] *Bos bubalus*, Lin.

ignoble manner, and his head in a very bad posture, almost always inclined towards the ground. His voice is a hideous bellowing, with a tone much stronger and more hoarse than that of the bull; his legs are thin, his tail bare, and his physiognomy dark, like his hair and skin. He differs externally from the ox, chiefly in the color of his hide; and this is easily perceived under the hair, with which he is but sparingly furnished. His body is likewise thicker and shorter than that of the ox; his legs are longer, and proportionably much less. The horns not so round, black, and partly compressed, with a tuft of hair frizzled over his forehead; his hide is likewise thicker and harder than that of the ox; his flesh is black and hard, and not only disagreeable to the taste, but to the smell; the milk of the female is not so good as that of the cow; nevertheless she yields a greater quantity. In the hot countries of the eastern continent, almost all the cheese is made of buffalo's milk. The flesh of the young buffalo, though killed during the suckling time, is not good. The hide alone, is of more value than all the rest of the beast, whose tongue is the only part that is fit to eat. This hide is firm, light, and almost impenetrable. As these animals, in general, are larger and stronger than the oxen, they are very serviceable in the plough; they draw well, but do not carry burdens; they are led by the means of a ring passed through their nose. Two buffalos, harnessed, or rather chained, to a wagon, will draw as much as four strong horses.

The form and thickness of the buffalo, alone, are sufficient to indicate that he is a native of the hottest countries. The largest quadrupeds belong to the torrid zone in the Old Continent; and the buffalo, for his size and thickness, ought to be classed with the elephant, the rhinoceros, and the hippopotamus. The camel is more elevated, but slenderer, and is also an inhabitant of the southern countries of Africa and Asia; nevertheless, the buffalos live and multiply in Italy, in France, and in other temperate provinces. Those that are in the French king's menagerie, have brought forth two or three times. The female has but one at a time, and goes about twelve months; which is another proof of the difference between this species and that of the cow, who only goes nine months. It appears, also, that these animals are gentler and less brutal in their native country; and the hotter the climate is, the more tractable is their nature. In Egypt they are more so than in Italy; and in India they are more so than in Egypt. Those of Italy have also more hair than those of Egypt, and those of Egypt more than those of India. Their coat is never entirely covered, because they are natives of hot countries; and, in general, large animals of this climate have either no hair, or else very little.

There are a great number of wild buffalos in the countries of Africa and India, which are watered with many rivers, and furnished with large meadows. These wild buffalos go in droves, and make great havoc in cultivated lands; but they never attack the human species, and will not run at

them, unless they are wounded, when they are very dangerous; for they make directly at their enemy, throw him down, and trample him to death under their feet; nevertheless, they are greatly terrified at the sight of fire, and are displeased at a red color.

The buffalo, like all other animals of southern climates, is fond of bathing, and even of remaining in the water; he swims very well, and boldly traverses the most rapid floods. As his legs are longer than those of the ox, he runs also quicker upon land. The negroes in Guinea, and the Indians in Malabar, where the wild buffalos are very numerous, often hunt them. They neither pursue them nor attack them openly, but, climbing up the trees, or hiding themselves in the woods, they wait for them and kill them; the buffalos not being able, without much trouble, to penetrate these forests, on account of the thickness of their bodies, and the impediment of their horns, which are apt to entangle in the branches of the trees. These people are fond of the flesh of the buffalo, and gain great profit by vending their hides and their horns, which are harder and better than those of the ox.

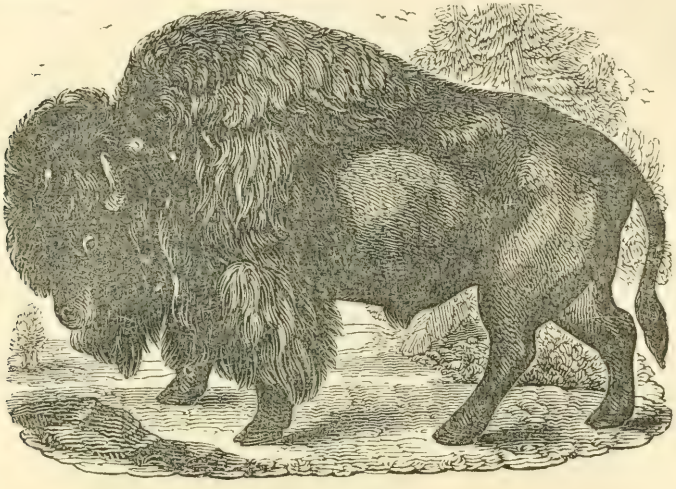
Although the buffalo is, at this present time, common in Greece, and tame in Italy, it was neither known by the Greeks nor Romans; for it never had a name in the language of these people. The word *buffalo*, even indicates a strange origin, not to be derived either from the Greek or Latin tongues. In effect, this animal is originally a native of the hottest countries of Africa and India, and was not transported and naturalized in Italy till towards the seventh century. It is true, the ancients have spoken of an animal, as of a different species from the ox, under the name of *bubalus;* and Aristotle has mentioned the wild ox of Pæonia, which he has called *bonasus*.

THE AMERICAN BISON.[1]

One of the earliest accounts we have of this animal, is by Hernandez; and Recchus' edition of his observations, or rather commentary upon them, is illustrated by an engraving which seems to have been made from a rude sketch of the bison, altered by the European artists to a closer resemblance with the European ox. Hennepin, in the narrative of his discovery of Louisiana, and his travels through that country, between the years 1669 and 1682, gives a very good description of the bison, together with a figure, which is apparently a copy of that of Recchus. It does not appear to have excited much attention in Europe until lately, when several specimens, having been imported into England, were exhibited under the attractive title of *bonasus*, which, though described by the ancients, was asserted to

[1] *Bos Americanus*, Gmel.

have been lost to the moderns, until recognised in the American animal. The American bison, has, in fact, much resemblance to the *aurochs* of the Germans, (*Bos urus*, Boddært,) identified by Cuvier, with the *bonasus* of Aristotle, the *bison* of Pausanias and Pliny, and the *urus* of Cæsar; and which, down to the reign of Charlemagne, was not rare in Germany, but is now nearly confined to the hilly country lying between the Caspian and Black seas.



The bison wanders constantly from place to place, either from being disturbed by hunters or in quest of food. They are much attracted by the soft tender grass, which springs up after a fire has spread over the prairie. In winter they scrape away the snow with their feet to reach the grass. The bulls and cows live in separate herds, for the greater part of the year, but at all seasons, one or two old bulls generally accompany a large herd of cows. In the rutting season, the males fight against each other with great fury, and, at that period it is very dangerous to approach them. The bison is, however, in general, a shy animal, and takes to flight instantly on winding an enemy, which the acuteness of its sense of smell enables it to do, from a great distance. They are less wary when they are assembled together in numbers, and will then often blindly follow their leaders, regardless of, or trampling down, the hunters posted in their way. It is dangerous for the hunter to show himself after having wounded one; for it will pursue him, and although its gait may appear heavy and awkward, it will have no great difficulty in overtaking the fleetest runner.

Mr Finnan M'Donald, of the Hudson's Bay Company's clerks, was descending the Saskatchewan in a boat, and one evening having pitched his

tent for the night, he went out in the dusk to look for game. It had become nearly dark, when he fired at a bison bull, which was galloping over a small eminence, and as he was hastening forward to see if his shot had taken effect, the wounded beast made a rush at him. He had the presence of mind to seize the animal by the long hair on its forehead, as it struck him on the side with its horn, and being a remarkably tall and powerful man, a struggle ensued, which continued until his wrist was severely sprained, and his arm was rendered powerless; he then fell, and after receiving two or three blows became senseless. Shortly afterwards, he was found by his companions lying bathed in blood, being gored in several places; and the bison was couched beside him, apparently waiting to renew the attack had he shown any signs of life. Mr M'Donald recovered from the immediate effects of the injuries he received, but died a few months afterwards. When it contends with a dog, it strikes violently with its fore feet, and in that way, proves more than a match for any English bull-dog.

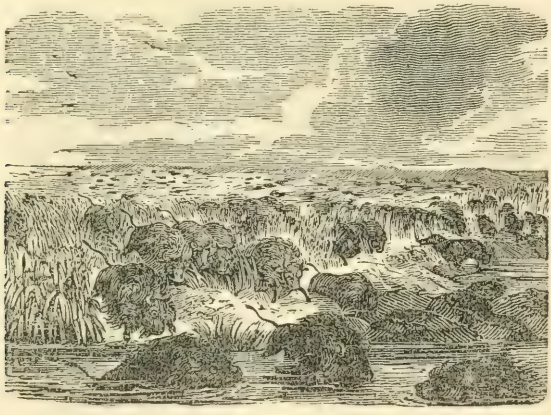
The favorite Indian method of killing the bison is, by riding up to the fattest of the herd on horseback, and shooting it. When a large party

of hunters are engaged in this way, on an extensive plain, the spectacle is very imposing, and the young men have many opportunities of displaying their skill and agility. The horses appear to enjoy the sport as much as their riders, and are very active in eluding the shock of the animal, should it turn on its pursuer. The most generally practised plan, however, of shooting the bison, is by crawling towards them from to leeward; and in favorable places, great numbers are taken in pounds. When the bison runs, it leans very much first to one side for a short space of time and then to the other, and so on alternately.

The flesh of a bison, in good condition, is very juicy and well flavored; much resembling that of well fed beef. The tongue is considered a delicacy, and may be cured so as to surpass in flavor the tongue of an English

cow. The hump of flesh covering the long spinous processes of the dorsal vertebræ, is much esteemed. It is named *bos* by the Canadian voyagers, and *wig* by the Orkney men, in the service of the Hudson's Bay Company. The wig has a fine grain, and when salted and cut transversely, it is almost as rich and tender as the tongue. The fine wool which clothes the bison, renders its skin, when properly dressed, an excellent blanket. The wool has been manufactured in England into a remarkably fine and beautiful cloth; and in the colony of Osnaboyna, on the Red river, a warm and durable coarse cloth is made of it. Much of the pemmican used by the voyagers attached to the fur companies, is made of bison meat, procured at their posts on the Red river and Saskatchewan. One bison cow in good condition, furnishes dried meat and fat enough to make a bag of pemmican weighing ninety pounds.

The herds of bisons wander over the country in search of food, usually led by a bull, most remarkable for strength and fierceness. While feeding, they are often scattered over a great extent of country, but when they move in mass, they form a dense and almost impenetrable column, which, once in motion, is scarcely to be impeded. Their line of march is seldom interrupted, even by considerable rivers; across which they swim without fear or



hesitation, nearly in the order that they traverse the plains. When flying before their pursuers, it would be in vain for the foremost to halt, or attempt to obstruct the progress of the main body; as the throng in the rear still rushing onward, the leaders must advance, although destruction awaits the movement. The Indians take advantage of this circumstance, to destroy great quantities of this favorite game; and, certainly, no mode could be resorted to, more effectively destructive, nor could a more terrible devastation be produced, than that of forcing a numerous herd of these large

animals, to leap together from the brink of a dreadful precipice, upon a rocky and broken surface, a hundred feet below.

When the Indians determine to destroy bisons in this way, one of their swiftest footed and most active young men is selected, who is disguised in a bison skin, having the head, ears, and horns adjusted on his own head, so as to make the deception very complete; and thus accoutred, he stations himself between the bison herd and some of the precipices, that often extend for several miles along the rivers. The Indians surround the herd as nearly as possible, when, at a given signal, they show themselves and rush forward with loud yells. The animals being alarmed, and seeing no way open but in the direction of the disguised Indian, run towards him, and he, taking to flight, dashes on to the precipice, where he suddenly secures himself in some previously ascertained crevice. The foremost of the herd arrives at the brink—there is no possibility of retreat, no chance of escape; the foremost may for an instant shrink with terror, but the crowd behind,

who are terrified by the approaching hunters, rush forward with increasing impetuosity, and the aggregated force hurls them successively into the gulf, where certain death awaits them.

The Indians make a bison pound, by fencing a circular space of about a hundred yards in diameter. The entrance is banked up with snow, sufficiently high to prevent the animals from retreating after they have once entered. For about a mile on each side of the road leading to the pound, stakes are driven into the ground at nearly equal distances, of about twenty yards, which are intended to look like men, and to deter the animals from endeavoring to break through the fence. Within fifty or sixty yards of the pound, branches of trees are placed between the stakes, to screen the Indians, who lie down behind them, to wait for the approach of the bison. The mounted hunters display the greatest dexterity in this sort of chase, as they are obliged to manœuvre around the herd in the plains so as to urge them into the road-way, which is about a quarter of a mile broad. When

this is effected, the Indians raise loud shouts, and pressing closely on the animals, terrify them so much, that they rush heedlessly forwards towards the snare. When they have advanced as far as the men who are lying in ambush, they also show themselves, increasing the consternation of the bisons by shouting violently and firing their guns. The affrighted animals have no alternative but to rush directly into the pound, where they are quickly dispatched by guns or arrows. In the centre of one of these pounds, there was a tree on which the Indians had hung stripes of bison flesh, and pieces of cloth, as tributary or grateful offerings to the Great Master of life. They occasionally place a man in the tree to sing to the presiding spirit, as the bisons advance. He is obliged to remain there until all the animals that have entered the pound are killed.

The bison is about eight feet in length. The head, shoulders, and upper part of the anterior extremities, are covered with a long, brownish, woolly hair. The tail is tufted with black. The horns are black, and turned laterally and upwards.

THE YAK.[1]

This animal has some resemblance to a buffalo in the shape of his head. His size is various; and the tail of one in the British Museum, is six feet long. The color is generally black, but many have white tails. They are fond of mountainous countries, and keep on the southern declivities in winter, and the northern in summer. The species is both wild and domesticated. The wild yaks abound in the mountains of Bootan and Thibet.

THE GAUR[2]

Is a species of bison, which appears to be one of the largest now living. It is six feet high at the shoulders, and twelve feet long. Its head resembles that of the common ox. Its most remarkable characteristic is a spinous elevated process, on the neck and shoulders. They live in families of ten or twenty. They are found in India.

THE GAYAL[3]

Is nearly the shape and size of a common bull. It has a sharp ridge over the shoulders. The general color is brown, and the tail is tufted. It inhabits the forests east of the Burrampooter.

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[1] *Bos grunniens*, Lin. [2] *Bos gauras*, Smith. [3] *Bos gavæus*, Smith.

THE DOMESTIC OX.[1]

Throughout the different regions of the world, the breed of oxen differs in all external appearances, according to the nature of the climate, or other circumstances. But the most remarkable difference is that which divides them into two classes; viz. the *aurochs*, or ox without a hunch on its back, and the *bison*, or hunched ox. All the tame oxen without hunches, have proceeded from the aurochs, and all with hunches are issues of the bison. In order to give a just idea of the varieties, we shall make a short enumeration of these animals, such as they are actually found to be, in different parts of the earth.

To begin with the north of Europe, the few oxen and cows which subsist in Iceland, are without horns, although they are of the same kind as our oxen. The size of these animals is rather relative to the plenty and quality of pasture, than to the nature of the climate. The Dutch have often brought lean cows from Denmark, which fatten prodigiously in their meadows, and which give plenty of milk. These Danish cows are longer than ours. The oxen and cows of Ukraine, where there is excellent pasture, are said to be the largest in Europe; they are also of the same kind as our oxen.

The breed of the bison, or hunched ox, fills all the southern provinces, at this present time. In the whole continent of India; the islands of the South Seas; in all Africa, from Mount Atlas to the Cape of Good Hope, we find, nothing but hunched oxen. And it even appears, that this breed, which has prevailed in all the hot countries, has many advantages over the others. These hunched oxen, like the bison, of which they are the issue, have the hair much softer and more glossy than our oxen; who, like the aurochs, are furnished with but little hair, which is of a harsh nature. These hunched oxen are also swifter, and more proper to supply the place of a horse; at the same time that they have a less brutal nature, and are not so clumsy and stupid as our oxen, they are more tractable, and sensible which way you would lead them. The regard the Indians have for these animals is so great, as to have almost degenerated into superstition. The ox, as the most useful animal, has appeared to them the most worthy of being revered; for this purpose, they have made an idol of the object of their veneration, a kind of beneficent and powerful divinity; for we are desirous of rendering all we respect, great, and capable of doing much good, or much harm.

These hunched oxen, perhaps, vary again more than ours, in the color of the hair, and the figure of the horns. The handsomest are all white, like the oxen of Lombardy. There are also some that are without horns; there are others, who have them very much elevated, and others so bent

[1] *Bos taurus*, Lin.

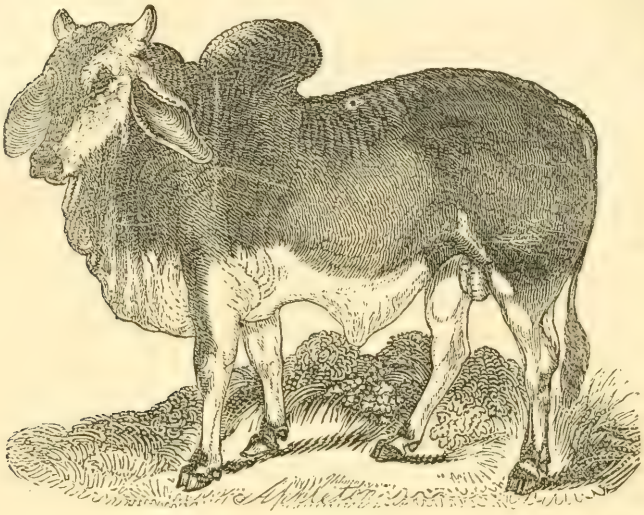
down, that they are almost pendent. It even appears, that we must divide this first kind of bisons, or hunched oxen, into two secondary kinds; the one very large, and the other very small. Both have soft hair, and a hunch on the back. This hunch does not depend on the conformation of the spine, nor on the bones of the shoulder; it is nothing but an excrescence, a kind of wen, a piece of tender flesh, as good to eat as the tongue of an ox. The wens of some oxen weigh about forty or fifty pounds; others have them much smaller. Some of these oxen have also prodigious horns for their size. There is one in the French king's cabinet, which is three feet and a half in length, and seven inches in diameter at the base. Many travellers affirm, they have seen them of a capacity sufficient to contain fifteen and even twenty pints of water.

On the contrary, all the northern countries of Africa and Asia, and Europe entirely, comprehending even the adjacent islands, to the Azores, are only inhabited by oxen without a hunch, who derive their origin from the aurochs.

Every part of South America is inhabited by oxen without hunches, which the Spaniards, and other Europeans, have successively transported. These oxen are multiplied, and are only become smaller in these countries. Thus the wild and the tame ox, the European, the Asian, the American, and the African ox, the bonasus, the aurochs, the bison, and the zebu, are all animals of one and the same species; who, according to the climates, food, and different usage they have met with, have undergone all the variations we have before explained. The ox, as the most useful animal, is also the most universally dispersed. He appears ancient in every climate, tame among civilized nations, and wild in desert or unpolished countries. He supports himself by his own strength when in a state of nature, and has never lost the qualities which are useful to the service of man. The young wild calves, which are taken from their mothers in India and Africa, have, in a short time, become as tractable as those which are the issue of the tame kind, and this natural conformity is another striking proof of the identity of the species.

The characters by which the strongly marked group of animals thus associated together, are distinguished from the neighboring tribes, are, like most of those which serve to subdivide the great family of the ruminants, of a very subordinate description. Their horns are common to both sexes, simple in their form, curved outwards at the base and upwards towards the point; and supported internally, by long processes arising from the skull, having cavities within them communicating with the frontal sinuses, which are largely developed. Their muzzle is of large size; the skin along the middle of the neck and chest forms a pendulous dewlap of greater or less extent; and the general robustness of their make is strikingly contrasted with the lightness and elegance of form of some of the nearly related groups.

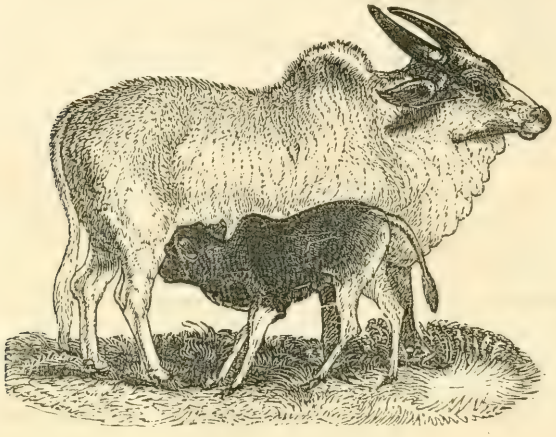
There can be little doubt that the zebu, or Indian ox, is merely a variety of the common ox, although it is difficult to ascertain the causes by which the distinctive characters of the two races have been in the process of time gradually produced. But whatever the causes may have been, their effects rapidly disappear by the intermixture of the breeds, and are entirely lost at the end of a few generations. This intermixture and its results would



alone furnish a sufficient proof of identity of origin; which consequently scarcely requires the confirmation to be derived from the perfect agreement of their internal structure, and of all the more essential particulars of their external conformation. These, however, are not wanting; not only is their anatomical structure the same, but the form of their heads, which affords the only certain means of distinguishing the actual species of this genus from each other, presents no difference whatever. In both the forehead is flat, or more properly slightly depressed; nearly square in its outlines, its height being equal to its breadth; and bounded above by a prominent line, forming an angular protuberance, passing directly across the skull between the basis of the horns. The only circumstances, in fact, in which the two animals differ, consist in a fatty hump on the shoulders of the zebu, and in the somewhat more slender and delicate make of its legs.

Numerous breeds of this humped variety, varying in size from that of a large mastiff dog, to that of a full grown buffalo, are spread, more or less extensively, over the whole of southern Asia, the islands of the Indian Archipelago, and the eastern coast of Africa, from Abyssinia to the Cape of Good Hope. In all these countries, the zebu supplies the place of the

ox, both as a beast of burthen and as an article of food and domestic economy. In some parts of India, it executes the duties of the horse also; being either saddled and ridden, or harnessed in a carriage, and performing in this manner journeys of considerable length with tolerable celerity. Some



of the older writers speak of fifty or sixty miles a day, as its usual rate of travelling; but the more moderate computation of recent authors does not exceed from twenty to thirty. Its beef is considered by no means despicable, although far from equalling that of the European ox. The hump, which is chiefly composed of fat, is reckoned the most delicate part. As might naturally be expected from its perfect domestication and wide diffusion, the zebu is subject to as great a variety of colors as those which affect the European race. Its most common hue is a light ashy gray, passing into a cream color or milk white; but it is not unfrequently marked with various shades of red or brown, and occasionally it becomes perfectly black. Its hump is sometimes elevated in a remarkable degree, and usually retains its upright position; but sometimes it becomes half pendulous, and hangs partly over towards one side. Instances are cited, in which it had attained the enormous weight of fifty pounds. A distinct breed is spoken of as common in Surat, which is furnished with a second hump. Among the other breeds, there are some which are entirely destitute of horns; and others, which have only the semblance of them, the external covering being unsupported by bony processes, and being consequently flexible and pendulous.

The whole of the breeds are treated with great veneration by the Hindoos, who hold it sinful to deprive them of life under any pretext whatever. But they do not, in general, scruple to make the animals labor for their benefit;

although they consider it the height of impiety to eat of their flesh. A select number are, however, exempted from all services, and have the privilege of straying about the towns and villages, and of taking their food wheresoever they please, if not sufficiently supplied by the pious contributions of the devotees who impose on themselves this charitable office.

ORDER X.—CETACEA.

These animals have a pisciform body, terminated by a caudal appendage, cartilaginous and horizontal; two anterior extremities formed like fins, having the bones which form them, flattened and very short; head joined to the body by a very short, thick neck; two pectoral or abdominal mammæ; ears with very small external openings; brain large; pelvis and bones of the posterior extremities represented by two rudimentary bones lost in the flesh.

THE MANATI.[1]

This animal may be indiscriminately called the last of beasts, or first of fishes. It cannot be called a quadruped; nor can it entirely be termed a fish. It partakes of the nature of the fish by its two feet or hands; but the hind legs, which are almost wholly concealed, in the bodies of the seal and morse, are entirely wanting in the manati. Instead of two short feet and a small narrow tail, which is placed in a horizontal direction in the morse, the manati has only a thick tail, spread out broad like a fan. Oviedo seems to be the first author who has given any sort of history or description of the manati; he says, "it is a very clumsy and misshapen animal, the head of which is thicker than that of an ox; the eyes small, and the two feet or hands are placed near the head, for the purpose of swimming. It has no scales, but is covered with a skin, or rather a thick hide, with a few hairs or bristles. It is a peaceable animal, and feeds upon the herbage by the river sides, without entirely leaving the water, swimming on the surface of it to seek its food. The hunters practise the following method to take the manati; they row themselves in a boat or raft as near the animal as possible, and dart a very strong lance into it, to the end of which a very long cord is fastened. The manati feeling itself wounded, instantly swims

[1] *Manatus Americanus*, Desm. The genus *Manatus* has two upper incisors; no canines; eighteen upper and eighteen lower molars. The incisors exists only in the fœtus, and the adults have only thirty-two teeth, four of the molars falling out in early age; molars with two transverse cushions on their crown; head not distinct from the body; eyes very small; tongue oval; vestiges of nails on the margin of the pectoral fins; six cervical vertebræ; sixteen pair of thick ribs; mustaches composed of a bundle of very strong hairs, directed downwards, and forming on each side a kind of corneous tusk.

away, or plunges to the bottom; but the cord which holds the lance, has a cork or piece of wood fastened to the end of it, to serve as a buoy. When the animal begins to grow faint and weak through the loss of blood, he swims to shore; the cord is then wound up, and the animal drawn within arm's length of the boat, where they dispatch it in the water by strokes of the oar or lance. It is so very heavy, as to be a sufficient load for two oxen to draw; its flesh is excellent eating, and is eaten rather as beef than as fish. Some of these animals measure more than fifteen feet in length, by six feet in breadth. The body becomes narrower towards the tail, and then spreads gradually broader towards the end. As the Spaniards give the appellation of hands to the feet of quadrupeds; and as this animal has only fore feet, they have given it the name of *manati*, that is, an animal with hands. The female has breasts placed forward, like those of a woman; and she generally brings forth two young ones at a time, which she suckles."

"The flesh and fat of this animal," says M. de Condamine, "have a great resemblance to veal. It is not, properly speaking, amphibious, since it never entirely leaves the water; having only two flat fins, close to the head, about sixteen inches long, and which serves the animal instead of arms and hands. It only raises its head out of the water to feed on the herbage by the sea-side. The eyes of this animal have no proportion to the size of its body; the orifice of its ears is still less, and only seems like a hole made by a pin. The manati is not peculiar to the Amazonian river; for it is not less common in the Oronoko. It is found, also, though less frequently, in the Oyapoc, and many other rivers in the environs of Cayenne, and the coast of Guiana, and probably in other parts."

The female of this animal, from the position of the breasts, probably gave rise among mariners, to the fable of the mermaid. Columbus, when he first saw these animals in the West Indies, called them *sirens*.

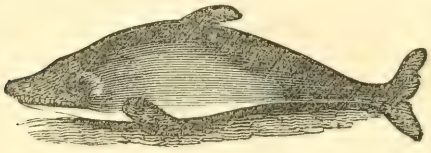
THE ROUND-TAILED MANATI.[1]

This animal frequents most of the great African rivers, from Senegal to the Cape of Good Hope, and also many of the rivers on the eastern shore of South America. It is often seen in the Amazons, nearly a thousand leagues from its mouth. It prefers shallow waters near low land, and is a frolicsome creature, frequently leaping into the air to great heights. The natives of America are said frequently to tame it, and we are told that it delights in music. The female, when struck by the harpoon, seems insensible to her own sufferings, and only anxious to protect her young one, by taking it under her fins or feet. The round-tailed manati is about six feet

[1] *Manatus Senegalensis*, Desm.

in length, and three or four in circumference. Its flesh is a white, well tasted, and salubrious food. When the thicker parts of the skin are cut into slices and dried, they become exceedingly tough, and form good whips. Of the thinner parts, which have more pliability, the Indians make thongs to fasten together the sides of their canoes.

THE DOLPHIN.[1]



This is a distinct animal from the small fish which sailors call by the same name; and though so often painted as being of the shape of the letter S, the dolphin is almost straight, the back being very slightly incurvated, and the body slender. The nose is long, narrow, and pointed, with a broad transverse band, or projection of the skin on its upper part. From the shape of the nose, the animal has been called the sea-goose. The mouth is very wide, and has twenty-one teeth in the upper, and nineteen in the lower jaw, somewhat above an inch long, conic at the upper end, sharp pointed, and bending a little in. They are placed at a small distance from each other; so that when the mouth is shut, the teeth of both jaws lock into each other. The spout hole is placed in the middle of the head; the tail is semi-lunar; the skin is smooth; the color of the back and sides dusky; the belly whitish. It swims with great swiftness, and its prey is fish, but particularly cod, herrings, and flat fish. The dolphin is longer and more slender than the porpoise, measuring nine or ten feet in length, and two in diameter.

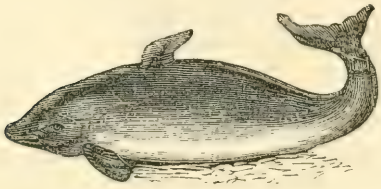
All this species have fins on the back; and resemble each other in their appetites, their manners, and conformation, being equally voracious, active, and roving. No fish could escape them, but from the awkward position of their mouth, which is placed in a manner under the head. Their own agility is so great, as to prevent them from being often taken; and they seldom remain a moment above water. Their too eager pursuit after prey occasionally, however, exposes them to danger; as they will sometimes follow the object of their pursuit even into the nets of the fishermen.

[1] *Delphinus delphis*, Lin. The genus *Delphinus* has teeth variable in number, of a canine form, sometimes compressed and dentated on their cutting margins, from two hundred to none at all; jaws more or less advanced in form of a beak; spiracles with a crescent shaped aperture; an adipose, dorsal fin, or a longitudinal fold of the skin; tail flattened horizontally, and bifurcated

A shoal of dolphins will frequently attend the course of a ship, for the scraps that are thrown overboard, or the barnacles adhering to their sides. A shoal of them followed the ships of Sir Richard Hawkins, upwards of a thousand leagues. Their gambols and evolutions on the surface of the water are often very amusing. A dolphin has been known to spring forward more than twenty feet at a single bound. They inhabit the Atlantic and Pacific oceans.

The flesh, though tolerably well tasted, is dry and insipid; the best parts are near the head. It is seldom eaten but when young and tender. Dolphins are said to change their color before they die, and again after they are dead.

THE PORPOISE.[1]



In its general form, the porpoise, or porpus, very much resembles the dolphin. It is, however, somewhat less in size, and has a snout much broader and shorter. It is generally from six to seven feet in length; its body is thick towards the head, but grows slender towards the tail, forming the figure of a cone. In each jaw are forty-four to fifty teeth, small, sharp pointed, and moveable; and so placed that the teeth of one jaw lock into those of the other. The eyes are small, as is the spout-hole at the top of the head. In colors the back is black, and the belly whitish, but they sometimes vary.

Porpoises are very numerous in the river St Lawrence, where there is a white kind. They are seldom seen, except in troops of six or seven to thirty and upwards; and, like the dolphin, they are very agile and sportive. In the most tempestuous weather, they can surmount the waves, and pursue their course, without injury. Seamen have a superstitious detestation of them, because they believe their appearance to be ominous of approaching storms.

These animals live chiefly on the smaller fish. At the season when mackerel, herrings, pilchards, and salmon appear, the porpoise swarms;

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[1] *Delphinus phocæna*, Lin.

and such is its violence in pursuit of its prey, that it will follow a shoal of small fish up a fresh water river, from whence it finds a difficulty to return. These creatures have been often taken in the river Thames, both above and below London bridge; and it is curious to observe with what dexterity they avoid their pursuers, and how momentarily they recover their breath above the water. It is usual to spread four or five boats over the part of the river where they are seen, and to fire at them the instant they rise. One porpoise yields about a hogshead of oil, and therefore renders its capture an object of consideration.

It is said that, whenever a porpoise happens to be wounded, all the rest of its companions will immediately fall upon and devour it.

THE GRAMPUS[1]

Is about twenty-four feet in length. It is a clumsy, unsightly fish, dark on the upper part, but very white below. The lower jaw is considerably wider than the upper. The back fin sometimes measures six feet. The grampus is an exceedingly voracious animal, which does not always spare even its own kind. Packs of them are said to attack the Greenland whale, like bull dogs, and tear off his flesh in masses. It, however, displays the utmost solicitude and affection for its young. Little oil is afforded by the grampus. It floats deep in the water, and would seldom be caught, did not its eagerness for prey prompt it to rush into shallow waters, where it is killed, but not till it has made a desperate and formidable resistance.

THE NARWHAL, OR SEA-UNICORN,[2]

Seldom exceeds twenty-two feet in length. Its body is slenderer than that of the whale, and its fat not so abundant. But this great animal is sufficiently distinguished from all others of the deep, by its tooth or teeth, which stand pointing directly forward from the upper jaw, and are from nine to ten feet long. In all the variety of weapons with which nature has armed her various tribes, there is not one so large or so formidable as this. This terrible weapon is generally found single; and some are of opinion that the animal is furnished with but one by nature: but there is at present the skull of a narwhal, at the Stadthouse at Amsterdam, with two teeth. The tooth, or as some are pleased to call it, the horn of the narwhal, is as

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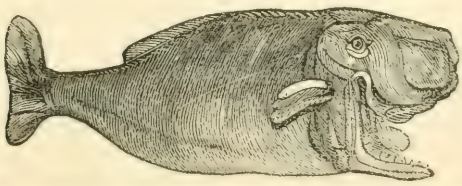
[1] *Delphinus grampus*, Desm.

[2] *Monodon monoceros*. This is the only one of the genus. The characteristics are one or two large tusks in the upper jaw; general form analogous to the dolphin's; orifice of the spiracles united on the top of the head; a longitudinal dorsal crest.

straight as an arrow, about the thickness of the small of a man's leg, wreathed in the manner we sometimes see twisted bars of iron. It tapers to a sharp point and is whiter, heavier, and harder than ivory. It is generally seen to spring from the left side of the head, directly forward, in a straight line with the body; and its root enters into the socket above a foot and a half. Notwithstanding its appointments for combat, this long and pointed tusk, amazing strength, and matchless celerity, the narwhal is one of the most harmless and peaceful inhabitants of the ocean. It is seen constantly and inoffensively sporting among the other great monsters of the deep, no way attempting to injure them, but pleased in their company. The Greenlanders call the narwhal the forerunner of the whale; for wherever it is seen, the whale is shortly after sure to follow. This may arise as well from the natural passion for society in these animals, as from both living upon the same food. The narwhal is much swifter than the whale, and would never be taken by the fishermen, but for those very tusks, which at first appear to be its principal defence. These animals are always seen in herds of several at a time; and whenever they are attacked, they crowd together in such a manner, that they are mutually embarrassed by their tusks. By these, they are often locked together, and are prevented from sinking to the bottom. It seldom happens therefore, but the fishermen make sure of one or two of the hindmost, which very well reward their trouble.

THE GREAT HEADED CACHALOT, OR SPERMACETI WHALE.[1]



This tribe is not of such enormous size as the whale, properly so called, not being above sixty feet long and sixteen feet high. In consequence of their being more slender, they are much more active than the common whale;

[1] *Physeter macrocephalus*, Desm. The genus *Physeter* has eighteen to twenty-three inferior teeth on each side of the jaw; upper jaw broad, elevated, without teeth, or with these short and concealed in the gum; lower jaw elongated, narrow, corresponding to a furrow of the upper, and armed with thick and conical teeth, entering into corresponding cavities of the upper jaw; spiracular orifices united at the upper part of the snout; a dorsal fin in some species, a simple eminence on others; cartilaginous cavities in the superior region of the head, filled with oily matter.

they remain a longer time at the bottom, and afford a smaller quantity of oil. As in the common whale, the head makes a third part of its bulk, so in this species the head is so large as to make one half of the whole. Their throats are much wider than those of the common whale, as may be judged from the fact, that the remains of sharks more than twelve feet long have been found in their stomachs. The cachalot is as destructive among the lesser fishes as the whale is harmless; and can at one gulp swallow a shoal of fishes down its enormous gullet. Linnæus tells us that this fish pursues and terrifies the dolphins and porpoises so much, as often to drive them on shore.

But, how formidable soever this fish may be to its fellows of the deep, it is by far the most valuable, and the most sought after by man; as it contains two very valuable drugs, spermaceti and ambergris. The whole oil of this fish is very easily convertible into spermaceti. This is performed by boiling it with a ley of potash, and hardening it in the manner of soap. Candles are now made of it, which are substituted for wax, and sold much cheaper.

As to the ambergris, which is sometimes found in this whale, it was long considered as a substance found floating on the surface of the sea; but time, that reveals the secrets of the mercenary, has discovered that it chiefly belongs to this animal. The name, which has been improperly given to the former substance, seems more justly to belong to this; for the ambergris is found in the place where the seminal vessels are usually situated in other animals. It is found in a bag of three or four feet long, in round lumps, from one to twenty pounds weight, floating in a fluid rather thinner than oil, and of a yellowish color. There are never seen more than four at a time in one of these bags; and that which weighed twenty pounds, and which was the largest ever seen, was found single. These balls of ambergris are not found in all fishes of this kind, but chiefly in the oldest and strongest.

The blunt headed cachalot is fifty-four feet in length. Its greatest circumference is just beyond the eyes, and is thirty feet. The upper jaw is five feet longer than the lower, which is ten feet. The head is above one third the size of the fish. The end of the upper jaw is blunt, and near nine feet high; the spout-hole placed near the end of it. The teeth are placed in the lower jaw, twenty-three on each side, all pointing outwards; and, in the upper jaw, opposite, are a number of holes to receive them when the mouth is closed. They are about eighteen inches long.

The spermaceti cachalot is found in greatest abundance in the Pacific ocean, where large numbers of them are annually killed by the American and other whalers, for the sake of their oil and spermaceti.

The spermaceti cachalot is gregarious, and herds are frequently seen containing two hundred or more individuals.

The mode of attacking these animals, is as follows: Whenever a number of them are seen, four boats, each provided with two or three lines and

harpoons, four lances, and a crew of six men, proceed in pursuit, and, if possible, each boat strikes or "fastens to," a distinct animal, and each crew kills their own. When engaged in distant pursuit, the harpooner generally steers the boat, and in such cases the proper boat steerer occasionally strikes, but the harpooner mostly kills it. If one cachalot of a herd is struck, it commonly takes the lead and is followed by the rest. The one which is struck, seldom descends far under water, but generally swims off with great rapidity, stopping after a short course, so that the boat can be drawn up to it by the line, or be rowed sufficiently near to lance it. In the agonies of death, the struggles of the animal are truly tremendous, and the surface of the ocean is lashed into foam by the motions of the fins and tail. Tall jets of blood are discharged from the blow-holes, which show that the wounds have taken mortal effect, and seeing this, the boats are kept aloof, lest they should be dashed to pieces by the violent efforts of the victim.

When a herd is attacked in this way, ten or twelve of the number are killed. Those which are only wounded are rarely captured. After the cachalot is killed, the boats tow it to the side of the ship, and if the weather be fine, and other objects of chase in view, they are again sent to the attack.

About three tons of oil are commonly obtained from a large cachalot; from one to two tons are procured from a small one. A cargo, produced from one hundred cachalots, may be from one hundred and fifty to two hundred tons of oil, besides the spermaceti, &c.

THE SMALL EYED, OR BLACK HEADED SPERMACETI WHALE,[1]

Is one of the most formidable monsters of the deep. It has an enormous dark colored head, armed with twenty-one projecting teeth on each side of the jaw. In a full grown specimen, these teeth are nine inches in length. This whale is often more than fifty feet in length, and is uncommonly active. Sharks, dolphins, and porpoises fall an easy prey to it.

THE COMMON WHALE[2]

Is the largest of all animals, being sometimes one hundred feet in length. It is commonly met with from sixty to seventy feet. The head makes a

[1] *Physeter microps*, Lacep.

[2] *Balæna mysticetus*, Lin. The genus *Balæna* has no teeth; upper jaw keel-formed, furnished on each side with whalebone, or transverse horny laminæ, slender, serrated, and attenuated at the edges; orifices of the spiracles separated, and placed towards the middle of the upper part of the head; a dorsal fin in some species; nodosities on the back in others.

third of its bulk. The fins on each side are from five to eight feet, composed of bones and muscles, and sufficiently strong to give speed and activity to the great mass of body which they move.

The tail is about twenty-four feet broad; and, when the fish lies on one side, its blow is tremendous. It is a curious piece of mechanism, consisting of two lobes wholly made up of strong, tendinous fibres, connected with the major part of the muscular structure of the body. Of those fibres there are three distinct layers, of which the two external are in the direction of the lobes, and the internal in an opposite direction. This structure renders the tail of the whale one of the most flexible of animal organs. It can move all ways with equal ease; every part has its own individual motion.

The skin is smooth and black, and in some places marbled with white and yellow; which, running over the surface, has a very beautiful effect. The outward, or scarf skin of the whale, is no thicker than parchment; but this removed, the real skin appears, of about an inch thick, and covering the fat or blubber that lies beneath. This is from eight to twelve inches in thickness; and is, when the fish is in health, of a beautiful yellow. The muscles lie beneath; and these, like the flesh of quadrupeds, are very red and tough.

The cleft of the mouth is above twenty feet long, which is near one third of the animal's whole length; and the upper jaw is furnished with barbs, that lie, like the pipes of an organ, the greatest in the middle, and the smallest on the sides. These compose the whalebone, absurdly called fins, the longest spars of which are found to be not less than eighteen feet. The tongue is almost immoveably fixed to the lower jaw, seeming one great lump of fat; and, in fact, it fills several hogsheads with blubber. The eyes are not larger than those of an ox; and when the crystalline humor is dried, it does not appear larger than a pea. They are placed towards the back of the head, being the most convenient situation for enabling them to see both before and behind; as also to see over them, where their food is principally found. They are guarded by eyelids and eyelashes, as in quadrupeds; and they seem to be very sharp-sighted.

Nor is their sense of hearing in less perfection; for they are warned, at great distances, of any danger preparing against them. We have already observed, that the substance, called whalebone, is taken from the upper jaw of the animal, and is very different from the real bones of the whale. The real bones are hard, like those of great land animals, are very porous, and filled with marrow. Two great, strong bones sustain the under lip, lying against each other in the shape of a half-moon; some of these are twenty feet long. They are often seen in gardens, set up against each other, and are usually mistaken for the ribs.

The fidelity of these animals to each other, exceeds whatever we are told of even the constancy of birds. Some fishers, as Anderson informs us, having struck one of two whales, a male and a female, that were in com-

pany together, the wounded fish made a long and terrible resistance; it struck down a boat with three men in it, with a single blow of the tail, by which all went to the bottom. The other still attended its companion, and lent it every assistance; till, at last, the fish that was struck sunk under the number of its wounds: while its faithful associate, disdaining to survive the loss, with great bellowing, stretched itself upon the dead fish, and shared his fate.

The whale goes with young nine or ten months, and is then fatter than usual, particularly when near the time of bringing forth. The young ones continue at the breast for a year; during which time they are called by the sailors, *short heads*. They are then extremely fat, and yield above fifty barrels of blubber. The mother, at the same time, is equally lean and emaciated. At the age of two years, they are called *stunts*, as they do not thrive much immediately after quitting the breast; they then yield scarce above twenty or twenty-four barrels of blubber. From that time forward they are called *skull fish*, and their age is wholly unknown. The food of the whale, is a small insect, which is seen floating in those seas, and which Linnæus terms the *medusa*. These insects are black, and of the size of a small bean, and are sometimes seen floating in clusters on the surface of the water. They are of a round form like snails in a box, but they have wings, which are so tender that it is scarce possible to touch them without breaking. These, however, serve rather for swimming than flying. They have the taste of raw muscles, and have the smell of burnt sugar. Inoffensive as the whale is, it is not without enemies. There is a small animal, of the shell-fish kind, called the whale louse, that sticks to its body, as we see shells sticking to the foul bottom of a ship. This insinuates itself chiefly under the fins; and whatever efforts the great animal makes, it still keeps its hold, and lives upon the fat, which it is provided with instruments to arrive at.

The sword-fish, however, is the whale's most terrible enemy. "At the sight of this little animal," says Anderson, "the whale seems agitated in an extraordinary manner, leaping from the water as if with affright; wherever it appears, the whale perceives it at a distance, and flies from it in the opposite direction. I have been myself, a spectator of their terrible encounter. The whale has no instrument of defence except the tail; with that it endeavors to strike the enemy; and a single blow taking place, would effectually destroy its adversary. But the sword-fish is as active as the other is strong, and easily avoids the stroke; then bounding into the air, it falls upon its enemy, and endeavors not to pierce with its pointed beak, but to cut with its toothed edges. The sea all about is soon dyed with blood, proceeding from the wounds of the whale; while the enormous animal vainly endeavors to reach its invader and strikes with its tail against the surface of the water, making [illegible] at each blow louder than the noise of a cannon."

There is still another and more powerful enemy, called by the fishermen of New England, the *killer*. This is itself supposed to be a cetaceous animal, armed with strong and powerful teeth. A number of these are said to surround the whale, in the same manner as dogs get round a bull. Some attack it with their teeth, behind; others attempt it before; until, at last, the great animal is torn down; and its tongue is said to be the only part they devour when they have made it their prey. They are said to be of such great strength, that one of them alone was known to stop a dead whale, that several boats were towing along, and drag it from among them to the bottom.

But of all the enemies of these enormous fishes, man is the greatest; he alone, destroys more in a year, than the rest in an age, and actually has thinned their number in that part of the world where they are chiefly sought. At the first discovery of Greenland, whales not being used to be disturbed, frequently came into the very bays, and were accordingly killed almost close to the shore; so that the blubber being cut off was immediately boiled into oil on the spot. The ships in those times, took in nothing but the pure oil and the whalebone, and all the business was executed in the country; by which means, a ship could bring home the product of many more whales, than she can, according to the present method of conducting this trade. The fishery also was then so plentiful, that they were obliged sometimes to send other ships to fetch off the oil they had made, the quantity being more than the fishing ships could bring away. But time and change of circumstances, have shifted the situation of this trade. The ships coming in such numbers from Holland, Denmark, Hamburg, and other northern countries, all intruders upon the English, who were the first discoverers of Greenland, the whales were disturbed, and gradually, as other fish often do, forsaking the place, were not to be killed so near the shore as before; but are now found, and have been so ever since, in the openings and space among the ice, where they have deep water, and where they go sometimes a great many leagues from the shore.

The whale fishery begins in May, and continues all June and July; but whether the ships have good or bad success, they must come away, and get clear of the ice, by the end of August; so that in the month of September, at farthest, they may be expected home. But a ship that meets with a fortunate and early fishery in May, may return in June or July.

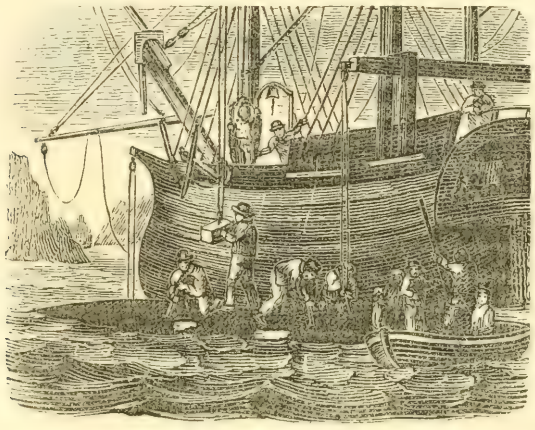
The manner of taking the Greenland whales is as follows:—Every ship is provided with six boats, to each of which belongs six men for rowing the boat, and a harpooner, whose business it is to strike the whale with his harpoon. Two of these boats are kept constantly on the watch, at some distance from the ship, fastened to pieces of ice, and are relieved by others every four hours. As soon as a whale is perceived, both the boats set out in pursuit of it, and if either of them can come up before the whale finally descends, which is known by his throwing up his tail, the harpooner dis-

charges his harpoon at him. There is no difficulty in choosing the place where the whale is to be struck, as some have asserted; for these creatures only come up to the surface in order to spout up the water, or *blow*, as the fishermen term it, and therefore always keep the soft and vulnerable part of their bodies above water. As soon as the whale is struck, the men set up one of their oars in the middle of the boat, as a signal to those in the ship. On perceiving this, the watchman alarms all the rest, with the cry of *fall! fall!* upon which all the other boats are immediately sent out to the assistance of the first.

The whale finding himself wounded, runs off with prodigious violence Sometimes he descends perpendicularly; at others goes off horizontally at a small depth below the surface. The rope which is fastened to the harpoon is about two hundred fathoms long, and properly coiled up, that it may be freely given out as there is a demand for it. At first, the velocity with which this line runs over the side of the boat is so great, that it is wetted to prevent its taking fire; but in a short time the strength of the whale begins to fail, and the fishermen, instead of letting out more rope, strive as much as possible to pull back what is given out already, though they always find themselves necessitated to yield at last to the efforts of the animal, to prevent his sinking their boat. If he runs out the two hundred fathoms of line contained in one boat, that belonging to another is immediately fastened to the end of the first, and so on; and there have been instances, where all the rope belonging to the six boats has been necessary, though half that quantity is seldom required. The whale cannot stay long below water, but again comes up to blow; and being now much fatigued and wounded, stays longer above water than usual. This gives another boat time to come up with him, and he is again struck with a harpoon. He

again descends, but with less force than before; and when he comes up again, is generally incapable of descending, but suffers himself to be wounded and killed with long lances, with which the men are provided for the purpose. He is known to be near death when he spouts up the water deeply tinged with blood.

The whale being dead, is lashed along side the ship. They then lay it on one side, and put two ropes, one at the head, and the other in the place of the tail, which, together with the fins, is struck off as soon as he is taken,



to keep these extremities above water. On the off side of the whale are two boats, to receive the pieces of fat, utensils, and men, that might otherwise fall into the water on that side. These precautions being taken, three or four men with irons at their feet, to prevent slipping, get on the whale, and begin to cut out pieces of about three feet thick and eight long, which are hauled up at the capstan or windlass. When the fat is all got off, they cut off the whiskers of the upper jaw, with an axe. Before they are cut, they are all lashed to keep them firm; which also facilitates the cutting, and prevents them from falling into the sea. When on board, five or six of them are bundled together, and properly stowed; and after all is got off, the carcass is turned adrift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the rest of the crew are employed in slicing them smaller, and picking out all the lean. When this is prepared, they stow it under the deck, where it lies till the fat of all the whales is on board; then cutting it still smaller, they put it up in casks in the hold, cramming them very full and close. Nothing now remains but to sail homewards, where the fat is to be boiled and melted down into train oil.

A late improvement has been made in the method of discharging the harpoon, namely, by shooting it out of a kind of *swivel* or musquetoon; but it does not appear that since this improvement was made, the whale fishing ships have had better success than before.

The flesh of this animal is a dainty to some nations; and the savages of Greenland, as well as those near the south pole, are fond of it to distraction. They eat the flesh, and drink the oil, which is a first-rate delicacy. The finding a dead whale is an adventure considered among the fortunate circumstances of their lives. They make their abode beside it; and seldom remove till they have left nothing but the bones.

CLASS SECOND—BIRDS.

Vertebrated animals with red and warm blood, respiring by lungs, and the young of which are produced from eggs. Body covered with feathers, and general conformation organized for flying.

The arrangement of birds into orders, has for its basis the conformation of the bill and feet; which are adapted to their different modes of living and food. Birds of prey are characterized by a hooked bill, and feet armed with strong and crooked nails. Climbers are those, the structure of whose feet is calculated for motion on an inclined or vertical surface; and web-footed birds are evidently adapted for swimming. Others, again, have the legs very long and naked, for wading; and a large number, with the claws short and feeble, live chiefly on insects. But though it be thus easy to separate the more strongly marked groups into extended families, yet it has been found extremely difficult to distribute them in subordinate groups, so as to facilitate the knowledge of species in a class so widely extended. In adopting the arrangement of Temminck, therefore, though his orders are more numerous, than those proposed by Cuvier and Vieillot, yet the families of the latter are in much greater number; and in an elementary work, it has been judged proper to follow that system which involves the least change of the established nomenclature, as likely to be most generally useful.

Birds support themselves, and direct their flight in the air, nearly in the same manner as fishes do in the water. But they are also calculated for motion on the ground; some families for motion on the surface of the water, or even, to a certain degree, through a mass of the same element: and their structure is varied to suit these different kinds of motion.

The part of the spine in birds which corresponds to the back, is immovable, and the only portions of the vertebral column capable of motion, are the vertebræ of the neck, and those of the tail. Their pectoral members, or arms, are elongated to wings, proper only for flight. These members, or wings, composed of one long finger and the vestiges of two others, are furnished with long, stiff, but elastic feathers, disposed like a fan, which follow the movement of the bone, and, when extended, occupy a large surface. The wings are attached by a double clavicle, and are supported by a broad sternum, carinated in front like the keel of a ship. This sternum is formed of five pieces firmly joined together; and the greater or less ossification of these pieces, is always relative to the powers of the bird for

flight. The long feathers attached to what may be termed the hand, generally to the number of ten, are termed *primaries;* the *secondaries*, variable in number, are those attached to the fore-arm; and the scapulars, are the smaller feathers, which are attached to the humerus. In describing birds, the term *remiges* is also used, to denote the feathers of the wings, which serve as oars; and *rectrices*, those of the tail, which have been considered to act as a rudder. The smaller feathers, which cover the base of the wing and tail, are termed *tectrices*. The anterior extremities, destined to support them in flight, can neither be used for prehension nor support, and birds thus take objects from the ground by their mouth. The neck is elongated, and the body thrown forward, that the bill may easily reach the ground. The pelvis is lengthened, to furnish an attachment for the muscles, which support the trunk upon the thighs; and there is an arrangement of muscles going from the pelvis to the toes, in such a manner that the weight of the animal bends the toes, and enables it to sleep perched upon one foot.

The bony part of the tail is short, but it carries a row of strong feathers, which, spreading, contribute to support the bird. The number of these feathers is generally twelve, sometimes fourteen, and in the gallinæ eighteen. The legs have a fermur, and a tibia, and the tarsus and metatarsus are represented by a single bone. The toes are attached to the tarsus, and are generally three before and a kind of thumb behind; which, however, is sometimes wanting. In the swallow it is directed forwards. In the climbers, on the contrary, the external toe and thumb are directed backwards. The number of joints increases in each toe, counting from the thumb, which has two, to the external toe, which has five. Birds with toes entirely free, are adapted to walk or hop on a horizontal surface, such as the domestic fowl. Others with two toes behind and two before, such as the parrot, walk with difficulty, but climb with facility; and others again, such as ducks and swans, with the toes united by a membrane, are chiefly calculated for motion in the water. The bill in birds is covered with a corneous substance, and as these animals swallow their food without mastication, they are not furnished with teeth. The upper mandible is formed chiefly of the intermaxillary bones, prolonged behind into two arches, of which the internal is composed of the palate bones, and the external of the maxillary and jugal bones; and this mandible is united to the cranium by elastic laminæ. The bill is constructed less for bruising the food than for seizing and dividing it; and thus from the greater solidity and length of this organ, the nature of the food may be inferred. The bill, or beak, is sometimes furnished at its origin, with a fleshy or membranous caruncle, which is called the *cere;* and sometimes the beak is prolonged upon the forehead into a kind of horn or helmet, as in the calao. The two mandibles moveable upon one another, through the medium of an intermediate bone, placed at the articulation, is a distinguishing anatomical character, in the structure of the jaws of birds. The quills and feathers are composed of a bearded or

webbed stem, hollowed at its base; these webs or horizontal feathers are again themselves webbed by still smaller ones; and the texture, strength, lustre, and general form of these feathers are infinitely varied. The feathers fall off twice a year, and this change of plumage is termed *moulting*. In some species, the winter plumage differs from that of the summer; and in the greater number the female differs from the male, in her colors being less bright. The young generally resemble the female. The brain of birds has the same general characters as that of the other oviparous vertebrated animals, but is distinguished by its proportionally greater volume, which often exceeds that of the Mammalia. But this apparent magnitude is caused by tubercles analogous to the *corpora striata*, and not by the hemispheres, which are very small and without circumvolutions. The cerebellum is of considerable size, without lateral lobes, and almost completely formed by the vermiform process. The *trachea* or windpipe, in birds, is formed of complete rings. At its bifurcation, is a glottis, provided with muscles, termed the inferior larynx. This is the organ which produces the voice of birds; and it is afterwards modified by the length, breadth, and elasticity of the trachea, and its orifice in the throat. The upper larynx is simple. The cavity of the thorax is not in birds separated by a fleshy partition from the abdomen. The lungs adhere to the spine, and communicate with many membranous sacs, situate in the abdomen, under the axilla, and even in the cavities of the larger bones, the substance of the bill, and in the fistulous portions of the quills. The great quantity of air which birds respire, appears to have effect upon all their motions. They respire, it may be said, as well by the branches of the aorta, as by those of the pulmonary artery. It is believed that the temperature to which the bodies of birds is raised in hatching, and the great muscular force which they exert in almost continued flight for many days, depends upon the action of the air upon the blood. Birds, like all the vertebrated animals, possess five senses; but in this class, that of touch is least perfect. Their feathers prevent them from receiving, by immediate contact, the impressions of the object which they touch; and their feet are enveloped in corneous laminæ, or scales, which materially blunt sensation. All enjoy the organ of sight; and by a particular mechanism in the structure of the eye, they are enabled to perceive objects at a distance with the same facility as when near the body. Besides the two ordinary eyelids, there is always a third semi-transparent one placed at the internal angle of the eye, which, by the assistance of a remarkable muscular apparatus, may be drawn before the eye like a curtain. The cornea is very convex. Although birds have no external cartilaginous ear, all appear to enjoy the faculty of feeling. Some of the nocturnal birds have the auditory opening surrounded by feathers. The organs of smell are concealed in the base of the bill, and the breadth of the nasal openings determine their form. The sense of smell in the vulture and raven, is said to be so very acute, that they can smell carrion at a very

great distance; but this, from recent observation, seems doubtful. The tongue in birds, is supported by a production of the hyoid bone.

The taste is not very delicate. Digestion in birds is in proportion to the activity of their life, and the quantity of their respiration. The stomach is composed first of the *crop*, which is a dilatation of the œsophagus at the base of the neck. The food remains in this duct for some time, and there imbibes a fluid analogous to the saliva, which is secreted from the inside of the canal. When softened by the action of heat and moisture, it passes little by little into a muscular bag, called the *gizzard*, where the food is triturated the more easily, that many species swallow little stones to increase the effect. The gizzard, it has been remarked, is strongest in the birds which have slender bills, and which are of course unable to break down their food; in those which feed on fish or flesh, the muscles are much weaker, and the stomach is almost membranous. By the outlet of this stomach, the food, reduced to a species of chyme, flows through the remainder of the intestinal canal, where the nutritious parts are absorbed, and the remainder expelled by a *cloaca*, an orifice common to the urinary and genital organs. Birds, such as the partridge and common fowl, whose young are able to walk and feed themselves on their departure from the egg, do not generally live in pairs. One male serves many females, and the young are entirely trusted to the maternal care. The greater part of birds, however, are blind and helpless at their birth, and their parents are therefore under the necessity of providing for their subsistence. Pigeons disgorge half digested grains, to feed their young; and linnets bring them larvæ of insects, or the soft parts of other animals. These live always in pairs, construct their nest with great care, and constantly in the same manner; and each species appropriates for this purpose certain materials. All possess a kind of instinct which leads them to choose the most convenient places for their nests, such as best afford concealment, or which render them inaccessible to their enemies. In birds the ova exist already formed in the mother before fecundation; and it is not a rare occurrence to see eggs laid without impregnation, similar in every respect to those which produce young. Fecundation, in most of the species, is accomplished by mere juxtaposition. The eggs of birds differ much in the color of their calcareous covering. They have generally the form of an elongated ball, and one of their extremities is thicker than the other. The fecundated eggs require a certain heat, to be hatched; and the observation of this fact has led to the practice in Egypt, and elsewhere, of hatching large broods of chickens by artificial heat. The class of birds, though not apparently so useful to man as Mammalia, serve important purposes in the general economy of nature. Those whose food is chiefly insects, check the excessive reproduction of insect races, and for this purpose migrate at certain seasons to places where their food abounds. The indiscriminate destruction of crows and sparrows, in some districts, has accordingly been found to give rise to an

infinitely more prejudicial multiplication of creatures, still more destructive. Some families of birds destroy field mice, snakes, frogs, and lizards; and others again, are led by choice to feed on carrion, or dead animal matter. Birds, besides, are extensive agents in the spread of vegetables and even animals. It is well ascertained that wild ducks, in their emigrations, carry impregnated spawn into remote ponds, and thus stock them with fish; and many by swallowing seeds whole, and subsequently expelling them, are the means of spreading vegetation over an extent of surface which scarcely any other means could accomplish. A great portion of this class and their eggs may be used as food; and the feathers of many, form an object of commerce.

Nothing is more singular in the history of birds, than their periodical migrations. That these are connected in some measure with the necessity of a supply of food, and the impulse of reproduction, is almost demonstrated; but the instinctive feeling which guides them, without compass, across seas and continents, and enables them to migrate at certain periods, corresponding with the production of their food in distant countries, can only be referred to one Great Source.

> Who bade the stork, Columbus-like, explore
> Heavens not his own, and worlds unknown before?
> Who calls the council, states the certain day?
> Who forms the phalanx, and who points the way?

The flights of migratory birds have been noticed from the earliest periods; "the stork in the heaven knoweth her appointed times, and the turtle, and the crane, and the swallow observe the time of their coming." And, as if their passage through the air, or the structure of their bodies made them sooner perceive the incipient changes of the weather, the appearance and cries of birds have long been considered to afford presages of the coming storm, or the cessation of the tempest. The institution of a college of Augurs, at Rome, may therefore be conceived to have reference to something better than mere superstition; and though the flight of particular species might, in the hands of interested individuals, be made to presage the wished for result of a battle, or direct a march already determined on, yet, in the absence of the barometer and thermometer, the appearance or disappearance and cries of birds, were the signals for the husbandman to sow his fields or to secure his crop.

> Jam veris prænuncia venit hirundo.—*Ovid.*
> Now comes the swallow, harbinger of spring.
>
> Tum cornix plena plurium vocat improba voce.—*Virg.*
> The crow with clamorous cries the shower demands.—*Dryd.*

In this country, the great migrations of birds take place in spring and autumn. Those which arrive in spring, come from warmer climates, and,

after incubation, leave us in autumn; and another host, chiefly palmipedes, from the arctic regions, arrive in autumn, pass the winter on our lakes and shores, and depart again in spring. Each species has a particular mode of flight, in these annual journeys, and a certain period of arrival and departure. Assembled in large flocks, the cranes cleave the air in the form of a long triangle; wild geese fly in angular lines; and the smaller birds associate in less numerous families, and reach their destination in less continued flights. One of the most curious particulars connected with the annual migrations of birds, is the circumstance of individuals returning for a series of years to the same nestling places. Spallanzani having tied a thread of red silk round the leg of a swallow, which built its nest in his window, saw for three seasons the same stranger, with its progeny, annually appear. Ekmark remarked a lame starling, which occupied the same nest in the hole of an old alder, for a period of eight years; and similar instances are on record, concerning many other species of migratory birds. This wonderful direction of instinct, which divides the innumerable flocks of birds in their progress northward, and leads particular families to seek the protection of the same roof, or the same chimney top, which formerly sheltered them, affords a subject not the least worthy of contemplation, among the thousand instances of wisdom and beneficence which arrest the student of nature, at every step of his progress. The flight of birds is very rapid. Birds of prey have been observed to fly at the rate of about twenty leagues in an hour. A falcon belonging to Henry II. of France, escaping from Fontainbleau, was found next day at Malta, a distance of thirteen hundred and fifty miles, and recognized from the ring on its leg Sir Hans Sloane mentions that, at Barbadoes, the gulls came to feed, and returned two hundred miles the same day. And Mr Audubon relates of the migratory pigeons of America, that they have been killed in the neighborhood of New York with rice in their crops, collected in the fields of Georgia and Carolina, the nearest points at which this supply could have been obtained. Reasoning from the fact, that the food of pigeons is entirely digested in twelve hours, Mr Audubon concludes that they must have travelled between three and four hundred miles in six hours. Birds in general live long, considering how early they arrive at maturity. Swans are said to live for a hundred years; and the pelican arrives at a similar age. Carnivorous birds, particularly the eagle, live to a very great age, perhaps beyond a century; the raven for a still longer period: and parrots have been known to live from sixty to eighty years. The life of gallinaceous birds, such as the domestic fowl, the pheasant, and the partridge, seldom exceeds twelve or twenty years.

ORDER I.—RAPACES.

Birds of this order have the bill short and strong; upper mandible covered at its base by a membrane or cere, compressed on the sides and hooked towards its extremity; nostrils open; legs strong, muscular, short or medium length, feathered to the knee or toes; toes three before and one behind, divided, or united at the base by a membrane, rough below, armed with powerful claws, sharp, retractile, and hooked. Nearly all these birds live on animal food; the females are always larger than the males. The number of their eggs seldom exceeds four.

THE FULVOUS, OR GRIFFON VULTURE.[1]

This noble species of vulture, which is one of the largest birds of prey of the Old Continent, measuring from three feet and a half to four feet in length, and more than twice as much in the expanse of its wings, is found on the lofty mountain chains of Europe, Asia, and Africa. It is not uncommon during the summer, in the Alps and Pyrenees; but it is said to retreat in winter, to the north of Africa, extending itself, according to Le Vaillant, to the Cape of Good Hope.

The nest of the griffon vulture, is formed in the clefts of rocks. It lays from two to four eggs, which are of a grayish white, with numerous spots

[1] *Vultur fulvus*, Lin. The genus *Vultur* has the bill thick and short, deeper than broad; its base covered by a cere; upper mandible straight, bent towards the point; under mandible straight, rounded, and inclined at the point; head naked, or covered with a short down; nostrils naked, lateral, opening diagonally towards the edge of the cere; legs strong, furnished with slightly bent claws; the middle toe largest, and united with the exterior one at the base.

Of the characters the most obvious, is the absence of feathers to a greater or less extent on the head and neck, a mark of distinction which, like all the rest, is closely connected with the habits of the birds. Thus a falling off, or thinning of the feathers, is the frequent result of feeding upon flesh, especially when in a state of decay. The barrenness of these parts in the vultures, enables them, moreover, to burrow in the putrid carcasses on which they prey, without risk of soiling their plumage.

Their largely extended nostrils, and the great internal developement of these organs, would seem to be of manifest use in guiding the vultures to their prey, which they are generally believed to scent from a great distance. It has, however, been lately maintained by a most acute observer of the habits of birds, Mr Audubon, that this belief, which has been entertained from the earliest antiquity, is founded in error, and that the vultures are directed to their prey by sight alone; the lofty pitch at which they fly, and the surpassing excellence of their vision, enabling them to detect it at an almost inconceivable distance. Several of the experiments brought forward by that gentleman, in support of his hypothesis, appear at first sight almost decisive of the question. But we cannot consent to abandon the received opinion, corroborated as it is to the fullest extent, by the anatomical structure of the organs of smell, until repeated experiments shall have placed the fact beyond the possibility of doubt.

It is almost unnecessary to point out the great utility of the strong, deep curved bill of most of the vultures in tearing to pieces the carcasses on which they feed and consigning them in large masses to their maws. The nakedness of their legs may be regarded as dependent on the same causes, and serving the same purposes as that of their heads and necks.

of a very light and diluted red. Like all the other birds of its tribe, it feeds principally upon dead carcasses, to which it is frequently attracted in very considerable numbers. When it has once made a lodgment upon its prey it rarely quits the banquet while a morsel of flesh remains; so that it is not uncommon to see it perched upon a putrefying corpse for several successive days. It never attempts to carry off a portion, even to satisfy its young; but feeds them by discharging the half digested morsel from its maw. Sometimes, but very rarely, it makes its prey of living victims; and even then of such only as are incapable of offering the smallest resistance; for in a contest for superiority, it has not that advantage which is possessed by the falcon tribes, of lacerating its enemy with its talons, and must therefore rely upon the force of its beak alone. It is only, however, when no other mode of satiating its appetite presents itself, that it has recourse to the destruction of other animals for its subsistence.

After feeding, it is seen fixed for hours in one unvaried posture, patiently waiting until the work of digestion is completed, and the stimulus of hunger is renewed, to enable and to urge it to mount again into the upper regions of the air, and fly abroad in quest of its necessary food. If violently disturbed after a full meal, it is incapable of flight until it has disgorged the contents of its stomach; lightened of which, and freed from their debilitat-

ing effects, it is immediately in a condition to soar to such a pitch as, in spite of its magnitude, to become invisible to human sight.

In captivity, it appears to have no other desire, than that of obtaining its regular supply of food. So long as that is afforded it, it manifests a perfect indifference to the circumstances in which it is placed.

THE CONDOR.[1]

That the vulgar opinion of the immense size and ferocity of this, the largest of the American birds of prey, should have extended its influence over the minds even of scientific zoologists, can scarcely be regarded as affording

[1] *Cathartes gryphus*, Temminck. The genus *Cathartes* has the beak long, compressed, straight, bent towards the point; cere naked, covering more than half the beak; upper mandible turned towards the point; head oblong, naked, as well as the upper part of the neck; nostrils in the middle of the bill, near the ridge of the upper mandible, longitudinally cleft, broad, sometimes surmounted by fleshy appendages; legs with tarsus naked, more or less slender; middle toe long, and united to the exterior one at the base.

just grounds of surprise, when we consider how very imperfectly the condor was known to naturalists down to the commencement of the present century. Twenty years ago, one or two mutilated specimens formed the only memorials of its existence, in the cabinets of Europe; and all our knowledge of the living bird was derived from the relations of travellers, for the most part but little conversant with natural history, many of whom merely repeated, without examination, such stories as they found current; while others, less scrupulous or more fanciful, drew on their invention for those additional traits which they considered necessary to render the imaginary likeness perfect. Thus, the condor of the Andes was compared to the fabled roc, of Eastern mythology; and this monstrous fabrication of ignorant credulity was declared to be fully equalled, if not surpassed, by the stupendous native of the western hemisphere.

But it was reserved for one of the most scientific of modern travellers, the learned Baron Von Humboldt, completely to dispel the mist of prejudice, which had so long enveloped the history of the condor, and to describe that bird such as it really exists; to reduce its dimensions, its powers, and its propensities, within their just and natural limits, and to exhibit a faithful and highly interesting portrait in the place of an extravagant and grossly exaggerated caricature.

The condor forms the type of a genus, a second species of which is the king of the vultures, of British writers. They are both peculiar to the New World, but approach, in their most essential characters, very closely to the vultures of the Old Continent, differing from the latter principally in the large fleshy, or rather cartilaginous caruncle, which surmounts their beaks; in the large size of their oval and longitudinal nostrils, placed almost at the very extremity of the cere; and in the comparative length of their quill feathers, the third being the longest of the series. The most important of these differences, the size and position of their nostrils, appears to be well calculated to add to the already highly powerful sense of smell possessed by the typical vultures, and for which these birds have been almost proverbially celebrated from the earliest ages. There is also a third species, the Californian vulture, rivalling the condor in bulk, and agreeing, in every respect, with the generic characters of the group, except in the existence of the caruncle, of which they are entirely destitute.

In size the condor is little, if at all, superior to the bearded griffin, the lammergeyer of the Alps, with which Buffon was disposed conjecturally to confound it, but to which it bears at most but a distant relation. The greatest authentic measurement scarcely carries the extent of its wings beyond fourteen feet, and it appears rarely to attain so gigantic a size. M. Humboldt met with none that exceeded nine feet, and was assured by many credible inhabitants of the province of Quito, that they had never shot any that measured more than eleven. The length of a male specimen, somewhat less than nine feet in expanse, was three feet three inches from

the tip of the beak to the extremity of the tail; and its height, when perching, with the neck partly withdrawn, two feet eight inches. Its beak was two inches and three quarters in length, and an inch and a quarter in depth, when closed.

The beak of the condor is straight at the base, but the upper mandible becomes arched towards the point, and terminates in a strong and well curved hook. The basal half is of an ash brown, and the remaining portion towards the point is nearly white. The head and neck are bare of feathers, and covered with a hard, wrinkled, dusky reddish skin, on which are scattered some short brown or blackish hairs. On the top of the head, which is much flattened above, and extending some distance along the beak, is attached an oblong, firm caruncle, or comb, covered by a continuation of the skin which invests the head. This organ is peculiar to the male. It is connected to the beak only in its anterior part, and is separated from it at the base in such a manner as to allow of a free passage of the air to the large oval nostrils, which are situated beneath it at that part. Behind the eyes, which are somewhat elongated, and not sunk beneath the general surface of the head, the skin of the neck is, as it were, gathered into a series of descending folds, extending obliquely from the back of the head, over the temples, to the under side of the neck, and there connected anteriorly with a lax membrane or wattle, capable of being dilated at pleasure, like that of the common turkey. The neck is marked by numerous, deep parallel folds, produced by the habit of retracting the head, in which the bird indulges when at rest. In this position scarcely any part of the neck is visible.

Round the lower part of the neck, both sexes, the female as well as the male, are furnished with a broad white ruff, of downy feathers, which forms the line of separation between the naked skin above and the true feathers covering the body below it. All the other feathers, with the exception of the wing coverts and the secondary quill feathers, are of a bright black, generally mingled with a grayish tinge of greater or less intensity. In the female, the wing coverts are blackish gray; but the male has their points, and frequently as much as half their length, white. The wings of the latter are consequently distinguished from those of the female by their large white patches. The secondary quill feathers of both sexes are white on the outer side. The tail is short and wedge-shaped. The legs are excessively thick and powerful, and are colored of a bluish gray, intermingled with whitish streaks. Their elongated toes are united at the base by a loose but very apparent membrane, and are terminated by long, black talons, of considerable thickness, but very little curved. The hinder toe is much shorter than the rest; and its talon, although more distinctly curved, is equally wanting in strength; a deficiency which renders the foot much less powerful as an organ of prehension than that of any other of the large birds of the raptorial order.

The condor has been observed throughout the whole range of that immense chain of mountains which traverses the continent of South America, from the Straits of Magellan to the seventh degree of north latitude. It appears, however, to be much more common in Peru and Chili, than in any other part of the chain, and is most frequently met with at an elevation of from ten to fifteen thousand feet above the level of the ocean. Here, in the regions of perpetual snow, they may be seen grouped together to the number of three or four, but never in the large troops in which the true vultures sometimes assemble, on the bold points of the jutting rocks, many of the most remarkable of which are designated by the natives with names derived from the bird that haunts their pinnacles. It is only when driven by hunger, that it descends into the plains, which it quits as soon as its appetite is satiated, unable, as it would seem, to support for any great length of time the increased weight of the atmosphere and the warmer temperature of the lower world. On such occasions, it rarely perches on the branches of the trees, but generally takes up a position on the ground, for resting on which its comparatively straight talons are peculiarly fitted. It is said that the female bird builds no nest, but deposits its eggs upon the bare rock without protection of any kind. These eggs are stated to be perfectly white, and three or four inches in length. The female is also said to remain with her young for a whole year.

The habits of the condor partake of the bold ferocity of the eagle, and of the disgusting filthiness of the vulture. Although, like the latter, it appears to prefer the dead carcass, it frequently makes war upon a living prey; but the gripe of its talons is not sufficiently firm to enable it to carry off its victim through the air. Two of these birds, acting in concert, will frequently attack a puma, a llama, a calf, or even a full grown cow. They will pursue the poor animal with unwearied pertinacity, lacerating it incessantly with their beaks and talons, until it falls exhausted with fatigue and loss of blood. Then, having first seized upon its tongue, they proceed to tear out its eyes, and commence their feast with these favorite morsels.

The intestines form the second course of their banquet, which is usually continued until the birds have gorged themselves so fully as to render themselves incapable of using their wings in flight. The Indians, who are well acquainted with this effect of their voracity, are in the habit of turning it to account for their amusement in the chase. For this purpose they expose the dead body of a horse or a cow, by which some of the condors, which are generally hovering in the air in search of food, are speedily attracted. As soon as the birds have glutted themselves on the carcass, the Indians make their appearance, armed with the lasso, and the condors, being unable to escape by flight, are pursued and caught by means of these singular weapons with the greatest certainty. This sport is a peculiar favorite in the country, where it is held in a degree of estimation second to that of a bull-fight alone.

In tenacity of life, the condor exceeds almost every other bird. M. Humboldt relates that during his stay at Riobamba, he was present at some experiments which were made on one by the Indians who had taken it alive. They first strangled it with a lasso and hanged it on a tree, pulling it forcibly by the feet for several minutes; but scarcely was the lasso removed, when the bird arose and walked about as though nothing had occurred to affect it. It was then shot with three balls, discharged from a pistol, at less than four paces, all of which entered its body, and wounded it in the neck, chest, and abdomen; it still, however, kept its legs. Another ball struck its thigh, and it fell to the ground. This was preserved by M. Bonpland, for a considerable time, as a memorial of the circumstance. Ulloa had previously asserted, that in the colder parts of Peru, the skin of the condor was so closely covered with feathers, that eight or ten balls might be heard to strike it without penetrating its body. M. Humboldt's bird did not die of its wounds until after an interval of half an hour.

The stories which have long been current, on the authority of credulous travellers, imputing to the condor a propensity to carry off young children, and even to attack men and women, appear to have originated solely in that common feeling which delights in regarding mere possibilities in the light of positive facts. M. Humboldt declares that he never heard of an instance in which a child was carried off; although the children of the Indians who collect the snow on the mountains for sale, are constantly left sleeping in the open air in the midst of these birds, and offer, of course, a temptation which would be irresistible if not counteracted by some peculiar instinct. With respect to the risk incurred by men, while he confesses that two of these birds would be dangerous enemies for a single man to encounter, he states that he has frequently approached them within ten or twelve feet, as they sat three or four together perched upon the rocks, and that they showed no disposition to attack him. The Indians of Quito, moreover, unanimously assured him that men have nothing to apprehend from the condors.

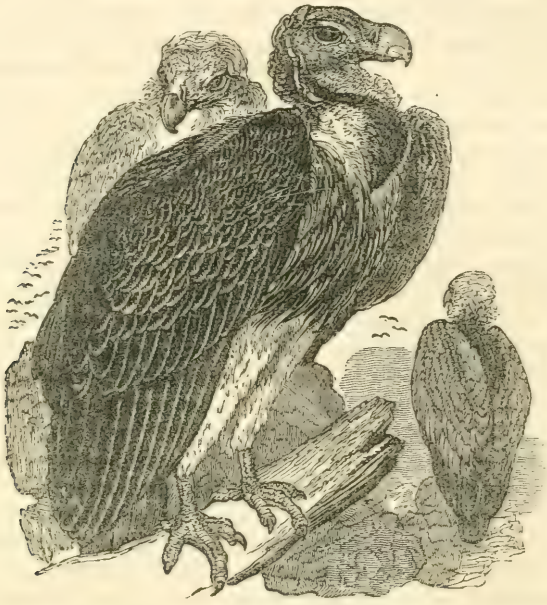
THE SOCIABLE VULTURE[1]

Is a bird of extreme rarity. It was first described by Le Vaillant, in his "Travels in the Interior of Africa," under the name of *oricou;* fancifully derived from the folding of the skin around its ears, and along its neck. A more detailed account of it was afterwards furnished by the same distinguished ornithologist, in his Oiseaux d'Afrique, where a full grown male is very accurately figured. We do not find that it has since been observed by

[1] *Vultur auricularis*, Daud.

any zoologist; for all the accounts of it with which we have met, are copied from Le Vaillant.

In size, this gigantic bird is fully equal to the condor; the larger specimen measuring, according to Le Vaillant, upwards of ten feet in the expanse of their wings. The head, and greater part of the neck are of the color of raw flesh, and exhibit in their adult state no appearance of down or



feathers, but only a few scarcely perceptible, scattered hairs. The throat is covered with blackish hairs, and the lower part of the neck behind, with a kind of ruff of crisped and curled feathers of the same color; within which, the bird withdraws its head while in a state of repose, especially after feeding; an attitude which is common to most of the vultures.

As Le Vaillant is the only writer who has observed these birds in their native state, our account of their manners must necessarily be derived from his work, which contains more detailed and authentic information relative to the habits of birds, than any other publication with which we are acquainted, excepting only Wilson's admirable Ornithology. We shall, therefore, make no apology for abstracting his history of the present species, with which he has combined many particulars equally applicable to the whole family. Like all the other vultures, he says, this is a bird of the mountains, the sheltered retreats formed by their caves and fissures constituting its proper habitation. In them it passes the night, and reposes,

after it has sated its appetite, during the day. At sunrise, large bands are seen perched on the rocks at the entrance of their abodes, and sometimes a continued chain of mountains exhibits them dispersed throughout the greater part of its extent. Their tails are always worn down by friction against the stones between which they thrust themselves, or on which they perch; while the eagles, seldom walking and frequently perching upon trees, preserve theirs more entire. Those of the vultures are moreover injured by the soil of the plains, inasmuch as they cannot raise themselves into the air at once, but only after running several paces forwards and by a forced contraction of the limbs. The flight of the vulture is nevertheless no less powerful and lofty; they raise themselves to a prodigious height, and disappear entirely from the sight.

It is scarcely to be conceived how these birds, which often cannot be distinguished in the air, can themselves perceive what is going on, on the surface of the earth, discover the animals on which they feed, and fall upon them the moment they are overtaken by death. When a hunter kills a large animal which he cannot immediately remove, if he abandon it for an instant, he finds on his return a band of vultures, where a quarter of an hour before not one was to be seen. Our author gives the particulars of several adventures of this kind that had befallen himself; and offers an explanation of the manner in which the vultures are enabled to detect their prey, strictly in accordance with the theory of Mr Audubon, to which we have before adverted. We quote this explanation at length, without, however, adopting the hypotheses which it involves.

"Desirous of observing," he says, "how so great a number of vultures could congregate together in so short a space of time, I concealed myself one day in a thicket, after having killed a large gazelle, which I left upon the spot. In an instant a number of ravens made their appearance, fluttering about the animal, and making a great croaking. In less than half a quarter of an hour these birds were reinforced by the arrival of kites and buzzards; and immediately afterwards I perceived on raising my head, a flight of birds at a prodigious height, wheeling round and round in their descent. These I soon recognised to be vultures, which seemed, if I may so express myself, to escape from a cavern in the sky. The first comers fell immediately upon the gazelle, but I did not allow them time to tear it in pieces. I left my concealment, and they betook themselves slowly and heavily to flight, rejoining their comrades, whose numbers continued to increase. They seemed almost to precipitate themselves from the clouds to share the spoil, but my presence caused them speedily to disappear. Thus it is then, that the vultures are called upon to participate in their prey; the first carnivorous birds that discover a carcass rouse the others which may happen to be in the environs by their cries and motions. If the nearest vulture does not spy the prey from the lofty region of the air in which he swims, by means of his wide spread wings, he perceives the subaltern and more terrestrial birds of

prey, preparing to take possession of it; but perhaps he has himself a sufficient power of vision to enable him to discover it. He descends hastily and with a wheeling flight, and his fall directs the other vultures who witness his evolutions, and who no doubt have their instinct sharpened with regard to every thing that concerns their food. A concourse of carnivorous birds speedily takes place in the neighborhood of the carcass, sufficient to attract the vultures of the whole district, nearly in the same manner as the disturbance created by a number of men running along the streets of a crowded town, attracts the whole population to follow in their train."

The present species is not met with in the vicinity of the Cape; but is very common in the interior, especially in the country of Manaquas. It builds its nest in the fissures of the rocks, and the female lays two or rarely three eggs. During the time of incubation the male keeps watch at the entrance of the cavern, and thus renders their retreat easy of detection; but on the other hand it is always very difficult of access. The interior offers a most disgusting spectacle, and is infected by an insupportable stench. Le Vaillant had eaten of their eggs, which, to use his own expression, are good enough to be made use of. As they live in formidable bands, a single mountain sometimes conceals as many nests as there are cavities fit for their reception. They appear to agree together exceedingly well, for two or three nests are sometimes seen placed side by side in the same cavern.

KING OF THE VULTURES.[1]

This is unquestionably one of the handsomest, although among the smaller species of the vulture family. The only other American vultures, the turkey buzzard, and a second closely allied species, (the black vulture) form a distinct genus nearly related to this, but differing essentially in several important points. It is no doubt in comparison with the two last mentioned birds, that the present has obtained, in the language of all the native tribes to which it is known, the appellation of king of the vultures; for it is far inferior, both in size and strength, to the gigantic species which are generically associated with it.

When fully grown, the king of the vultures measures about two feet and a half in total length, and more than twice as much in the expanse of its wings. The hues of its plumage are bright, sharply circumscribed, and strongly contrasting with each other. Round the base of the neck passes a broad ruff of soft downy feathers of a deep ashy gray; the whole under surface is white, with an occasional tinge of flesh color; the back and tail coverts are of a bright fawn, which becomes lighter and lighter as the bird

[1] *Cathartes Papa*, Lin.

advances in age; and the quill feathers of the wings and tail, together with the larger coverts of the former, are glossy black.

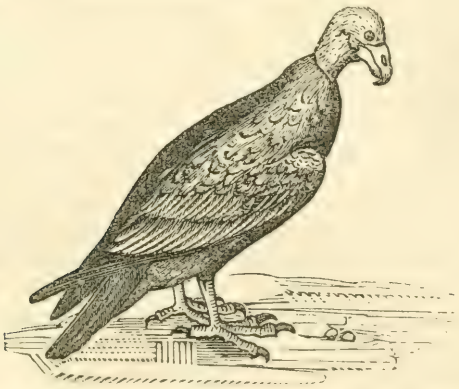
The young bird of the first year, according to M. D'Azara, is entirely of a deep bluish tint, excepting the abdomen and lateral tail coverts, which are white. In the second year it assumes a dusky hue, marked by long white spots. Up to this period, the greater part of the head and neck is blackish violet. In the third year it assumes its adult coloring, with the exception of a few black feathers among the upper wing coverts.

The range of this fine species of vulture is rather extensive. M. Bonaparte enumerates it among the birds of the United States, and we believe it is occasionally met with in Florida, which is probably its northern limit. Towards the south, M. D'Azara describes it as common in Paraguay, but says that it does not pass the thirty-second degree of latitude. In the intermediate countries it would seem to be extremely abundant. Many travellers mention it as congregating in large flocks in various parts of Mexico, where it appears to have been first noticed by Navarrete, and was soon after described by Hernandez under the native name of cozcaquauhtli. Its more usual name, however, in that country, seems to be tzopilotl, literally king of the vultures. In Guiana it bears, according to Sonnini, a title exactly synonymous; and in Paraguay, according to D'Azara, that of iriburubicha, signifying the same thing. This uniformity of appellation is evidently derived from the universality of the belief, that the other vultures pay a particular respect to this species, abandoning their prey to it, whenever it makes its appearance among them. But such a concession, as D'Azara

justly remarks, implies neither respect nor consideration; but is the natura effect of its superiority in size and strength.

Like the other vultures, these birds perform a most important office in the economy of nature, by the removing of dead, and putrefying carrion. Their sight is wide and piercing, their sense of smell highly developed, and their strength of wing sufficient to enable them to reach an extremely high pitch, and to continue their flight for hours together. They endure the pangs of hunger with extraordinary patience; and never attack the smallest bird or the most feeble quadruped while it has life. In walking, their gait is slow and heavy, and their body is maintained in a horizontal position. When about to mount into the air, they are compelled to take several leaps before they can accomplisn their purpose, and quit the ground with some little difficulty. The odor of their flesh is precisely the same with that of the carrion on which they feed, and even the skins retain it for many years. Contrary to the habits of their family in general, they perch on the tallest trees, living solitary or in pairs, building their nests, as it is said, in the hollows of the trunks, and laying only two eggs. They are little inclined to become familiar with man, but on the contrary avoid his habitations, and betake themselves every where to the interior and unfrequented parts of the country. In a deficiency of carrion they feed upon snakes and lizards, and during the summer subsist, in a great measure, upon the putrid fish of the lakes that are dried up by the parching heat of the sun.

THE AMERICAN CARRION VULTURE, OR TURKEY BUZZARD,[1]



Is found in vast flocks in parts of America, where it is of great utility in destroying snakes and vermin, and in devouring dead and putrid carcasses

[1] *Cathartes Aura*, Lin.

This bird is about the size of a turkey. The head and neck are bare of feathers, and of a reddish color, and the sides of the head warted like those of the turkey. The whole plumage is a brownish black, with a purple and greenish gloss in different directions.

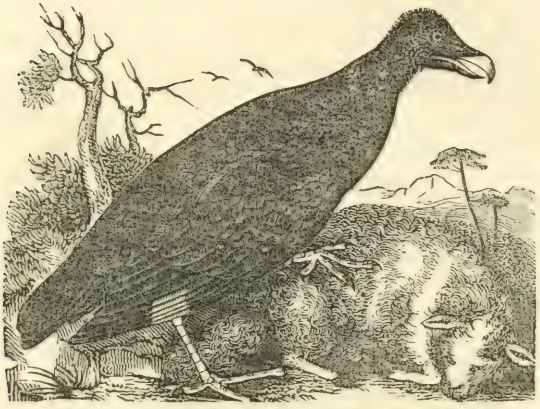
This species is well known throughout the United States, but is most numerous in the southern section of the Union. In the northern and middle states, it is partially migratory, the greater part retiring to the south on the approach of cold weather. But numbers remain all the winter in Maryland, Delaware, and New Jersey; particularly in the vicinity of the large rivers and the ocean, which afford a supply of food at all seasons. The female lays from two to four eggs in an old hollow tree or stump. If any one approach the young, and attempt to handle them, they will immediately vomit such offensive matter as to compel the intruder to a precipitate retreat.

The turkey buzzards are gregarious, peaceable, and harmless; never offering any violence to a living animal, nor depriving the husbandman of his stock. Hence, though in consequence of their filthy habits they are not beloved, yet they are respected for their usefulness; and in the southern states where they are most needed, they, as well as the black vultures, are protected by a law, which imposes a fine on those who wilfully deprive them of life. They generally roost in flocks on the limbs of large trees; and they may be seen on a summer's morning, spreading out their wings to the rising sun, and remaining in that posture for a considerable time.

The sense of smell in the turkey buzzard is astonishingly exquisite, and they never fail to discover carrion, even when at the distance of several miles. When once they have found a carcass, if not molested, they will remain in the place till the whole is devoured. At such times, they eat so immoderately that frequently they are incapable of rising, and may be caught without difficulty; but few that are acquainted with them, will have the temerity to undertake the task. A man in the state of Delaware some years since, observing some turkey buzzards regaling themselves upon the carcass of a horse, which was in a highly putrid state, conceived the design of making a captive of one, to take home for the amusement of his children. He cautiously approached, and springing upon the unsuspecting group, grasped a fine plump fellow in his arms, and was bearing off his prize in triumph; when lo! the indignant vulture disgorged such a torrent of filth in the face of our hero, that it produced all the effects of the most powerful emetic, and forever cured him of his inclination for turkey buzzards.

On the continent of America this species inhabits a vast range of territory, running it is said from Nova Scotia to Terra del Fuego, though it is comparatively rare in the northern states of the Union. They are numerous in the West India islands.

THE BLACK VULTURE.[1]



This bird has sometimes been confounded with the turkey buzzard. But they are much darker in their plumage than the latter, and never associate with them. Their mode of flight also differs from that of the turkey buzzard. The latter, though found in the vicinity of towns, rarely ventures within them. It is not so impatient of cold as the former, and is likewise less lazy. Unless pressed by hunger, it will not eat of a carcass until it becomes putrid. The black vulture is not so fastidious, but devours animal food without distinction. They are very indolent, and may be seen loitering for hours together in one place. It is said that they sometimes attack young pigs, and eat off their ears and tails; but those instances are rare.

In the towns and villages of the southern states, they may be seen sauntering about the streets; sunning themselves on the roofs of the houses and the fences; or, if the weather be cold, cowering around the tops of the chimneys to enjoy the benefit of the heat, which to them is a peculiar gratification. They are protected by law or usage; and may be said to be completely domesticated, being as common as the domestic poultry, and equally familiar. The inhabitants generally are disgusted with their filthy habits; but notwithstanding, being viewed as contributing to the removal of the dead animal matter, which, if permitted to putrefy during the hot season, would render the atmosphere impure, they have a respect paid them as scavengers, whose labors are subservient to the public good. It sometimes happens that after having gorged themselves, these birds vomit down the chimneys, which must be intolerably disgusting, and must provoke the ill-will of those whose hospitality is thus requited.

[1] *Cathartes Vulturinus*, Temm.

The black vulture is seldom found on the Atlantic, to the northward of Newbern, North Carolina; but inhabits the whole continent to the southward as far as Cape Horn.

THE LAMMERGEYER, OR BEARDED VULTURE.[1]

In its attitudes this bird resembles the eagles more than the vultures, its confident and sprightly bearing strongly contrasting with the crouching and suspicious postures of the latter. Like these, however, it generally retains its wings in a state of half expansion when at rest, and its neck more or less retracted within its shoulders. Its food, as we shall presently see, is more frequently sought in a living prey than on a putrefying carcass; and for this reason it is not often found, like the vultures, assembling in considerable troops. The increased curvature of its talons also contributes to the same object, by enabling it to carry off its prey, whether living or dead. A careful comparison of their characters, or, what is far better, of the animals themselves, as they exist side by side in the menagerie, will show how nearly this bird holds the middle station between the two large groups to which it is almost equally related.

Several nominal species were created by the naturalists on the close of the last century, which appear now, by common consent, to have been merged into one, the bearded vulture of ornithologists, or lammergeyer of the Swiss and German Alps. Its range extends to most of the principal mountain chains of the Old Continent, as it is found, with more or less fre-

[1] *Gypætus barbatus*, Cuv. The genus *Gypætus* has a long bill; upper mandible arched towards the point, and bent like a hook; nostrils oval, covered with stiff hairs directed forward; feet short; four toes, the three anterior united by a short membrane, the middle one very long; nails slightly crooked; wings long.

quency, but never in great abundance, in the Pyrenees, the Alps from Piedmont to Dalmatia, the mountains of Ghilan and Siberia, and those of Egypt and Abyssinia; occupying every where the loftiest and most inaccessible cliffs, and frequently committing dreadful ravages in the neighboring plains. In size it is the largest of European birds of prey, measuring, when fully grown, upwards of four feet from beak to tail, and in the expanse of its wings no less than nine or ten. M. Fortis indeed asserts that he had seen an individual in Dalmatia, the expanded wings of which measured twelve feet.

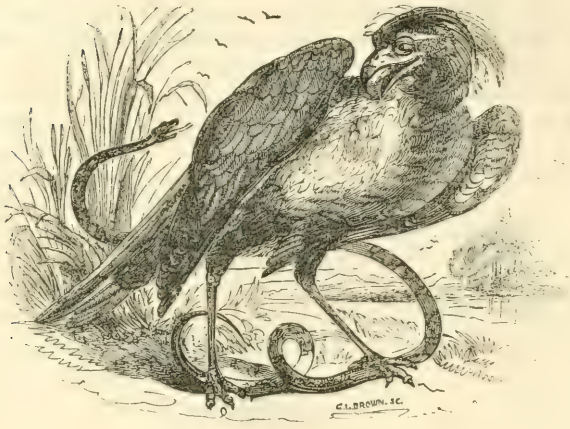
The general color of the upper part of this remarkable bird is a dull brown with a mixture of gray; its wings and tail are of a grayish ash color; the upper part of its head is a dirty white; a black band extends backwards from the base of the beak across the eye, and joins a narrower stripe of the same that passes upwards to unite with its fellow on the back of the head; and the neck, breast, and under parts are white with a shade of reddish brown or orange, which is deeper on the breast and throat, and gradually becomes less distinct on the abdomen and legs. For the first two years, the young birds are distinguished by the dusky brown of the head and neck; the mottled gray of their under surfaces, the large white spots, or spots of a lighter shade, scattered over their back and wings; and the dusky black of their quill feathers. Their iris is at first brown, and their toes of a livid color; but as they advance in age the former becomes of a bright red, and the latter assume a leaden hue. At all times the beak, which attains a length of four inches, is of an ashy gray with a flesh colored tinge; and the bristles at its base are deep black, as are also the talons.

In its habits this bird combines the audacity and cruelty of the eagles, with the appetite for carrion which distinguishes the vultures. It seizes by preference living victims, chiefly quadrupeds, and especially those which are incapable of making an effectual resistance, such as rabbits, hares, sheep and lambs, or even young goats and calves; and thus proves an extremely dangerous neighbor to the peaceful flocks which graze on the declivities of the mountains inhabited by it, or in the intervening valleys. Sometimes, when rendered desperate by a long fast, it is said to attack the chamois, or even man himself, choosing for the scene of its exploits the brink of a precipice, and descending upon its victim with such an irresistible impetus as to precipitate him headlong into the abyss below. But such bold attempts as this, although spoken of by many writers, are foreign to its usual habits, and may rather be regarded as traditions handed down from generation to generation, than as common or every day occurrences. In the same manner it is probable that the stories current in the Alps, of children carried off by vultures to be devoured, are rather the expression of a natural dread of what might happen, than a relation of actual events. We are not aware of any authentic testimony in proof of the fact, which may therefore be classed with the narratives of the same description with reference to the condor.

It is from the character in which it is best known to them, as the spoiler of the fold, that this bird has received from the natives of the German Alps its title of lammergeyer, the lamb vulture. But although this is its food of choice, it feeds also upon carrion; and as when in pursuit of a living prey, it emulates the eagles by soaring alone or in company only with its mate, so in its attack upon an unburied carcass it imitates the vultures by congregating in bands upon the spoil. In such circumstances it does not usually descend from aloft, but sweeps slowly along the ground towards its expected banquet. Bruce relates, in his Abyssinian Travels, a remarkable instance, illustrative at once of its boldness and voracity. His servants were preparing for dinner on the summit of a lofty mountain, when a bearded vulture, attracted by the smell of the goat's flesh, which they were cooking, slowly made his advances towards the party, and at length fairly seated himself within the ring which they had formed. The affrighted natives started up and ran for their lances and shields; and the bird, after an ineffectual attempt to extract a portion of their meat from the boiling water, seized a large piece in each of his talons from a platter that stood by, and carried it off slowly along the ground as he came. After an interval of a few minutes, the vulture returned for a second freight, but was shot by the traveller before it could carry its purpose into effect. The manner of its flight in this instance, as well as in many others, may be taken as an indication that this species does not usually make its prey of birds, which it is rarely if ever known to attack.

Bruce remarks that on taking hold of this bird he was not a little surprised to find his hands covered with a yellow powder, which appeared to be produced from the breast feathers; while those of the back and wings threw off a similar dust, excepting that on them it was brown. He imagined that this powder was contained in the tubes of the feathers, from which it was emitted upon pressure; and that it was a peculiar provision of nature to enable the birds of those Alpine regions to withstand the rigors of the climate. It is more probable, however, that this appearance, which has not been noticed by any other writer, was merely the result of the change of plumage which the vulture had just undergone; the powder in question being in reality nothing more than the original pellicle of the feathers separating from them in minute particles, as is usual when they have obtained their perfect growth.

THE SECRETARY VULTURE.[1]



This curious bird resembles the common falcon in its head, bill, and claws, but its legs are so long that, when it stands upright, it is not much unlike the crane. After much hesitation, modern naturalists have arranged it in the vulture order. When standing erect, it measures about three feet from the top of the head to the ground. It is a native of the interior of Africa, Asia, and the Philippine Islands. The general color of the plumage is a bluish ash; the tips of the wings, the thighs, and the vent inclining to black. On the back of the head are several long dark colored feathers, hanging down behind, and capable of being erected at pleasure. This crest induced the Dutch colonists at the Cape to give it the name of the secretary; the Hottentots, however, style it the serpent eater, from the avidity with which it catches and devours those noxious reptiles. The manner in which it seizes them, displays great intelligence. On approaching them, it carries forward the point of one of its wings, in order to parry their venomous bites, and waits till it finds an opportunity of spurning or treading on its adversary, or taking him on his pinions, and throwing him into the air. When he has at last thus wearied him out, he kills and devours him at his leisure.

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[1] *Gypogeranus serpentarius*, Temm. This is the only individual of the genus. Its characteristics are—bill shorter than the head, thick, strong, hooked, bent from its origin, furnished with a cere at its base, a little arched, compressed at the point; nostrils a little separated at the base, lateral, pierced in the cere, diagonal, oblong, open; legs very long, slender; tibia feathered; tarsus long, slenderer at its base than at its upper part; toes short, warty below, the anterior united at the base; thumb articulated on the tarsus wings long the first five wing feathers longest and almost equal; wings armed with a blunt spur.

M. le Vaillant witnessed one of these combats. Finding itself inferior in strength, the serpent endeavored to regain his hole, but the falcon, by a single leap, got before him and cut off his retreat. On whatever side the reptile strove to escape, the enemy still faced him. The serpent then erected himself to intimidate the bird, and hissing dreadfully, displayed his menacing throat, inflamed eyes, and a head swoln with rage and venom. Sometimes this produced a momentary suspension of hostilities; but the bird soon returned to the charge, and, covering her body with one of her wings as a buckler, struck her enemy with the bony protuberance of the other. The serpent at last dropped, and the bird laid open his skull with one stroke of her beak.

This singular bird may be easily tamed, and it becomes very domestic and familiar. Though, if severely pinched with hunger, it will devour ducklings and chickens; yet, if well fed, it will live with the poultry on amicable terms, and when it sees any of them quarrelling, will run to part the combatants. Unlike all the rest of the feathered race, these birds always strike forward with their legs when they fight.

THE JER FALCON[1]

In size exceeds all other falcons, for he approaches nearly to the magnitude of the eagle. The top of the head is flat, and of an ash color, with a strong, thick, short, and blue beak. The feathers of the beak and wings are marked with black spots, in the shape of a heart. He is a courageous and fierce bird, nor fears even the eagle himself; but he chiefly flies at the stork, the heron, and the crane. He is mostly found in the colder regions of the north, in Iceland, Denmark, and the north of Germany, but loses neither his strength nor his courage when brought into the milder climates.

Falconry, which is now so much disused, was the principal amusement of our European ancestors. A person of rank scarcely stirred out without his hawk on his hand, which in old paintings is the criterion of nobility. The expense which attended this sport was very great; among the old Welsh princes, the king's falconer was the fourth officer in the state; but, notwithstanding all his honors, he was forbidden to take more than three draughts of beer from his horn, lest he should get drunk and neglect his duty. In the reign of James the First, Sir Thomas Monson is said to have given a thousand pounds for a cast of hawks; and such was their value in

[1] *Falco Islandicus*, Gmel. The genus *Falco* has the head covered with feathers; bill hooked, generally bent from its origin; a colored cere, more or less hairy at its base; mandibles sometimes notched; nostrils lateral, rounded or oval, pierced in the cere, open; legs with tarsi covered with feathers or scales; three toes before, one behind, the exterior generally united at its base to the middle toe; claws sharp, much hooked, retractile.

general, that it was made felony in the reign of Edward the Third to steal a hawk. To take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, together with a fine at the king's pleasure.

Of many of the ancient falcons used for this purpose, we at this time know only the names. Of those in use at present, both in England and in other countries, are the jer falcon, the falcon, the lanner, the sacre, the hobby, the kestril, and the merlin. These are called the long winged hawks, to distinguish them from the goshawk, the sparrow-hawk, the kite, and the buzzard, that are of shorter wing, and either too slow, too cowardly, too indolent, or too obstinate, to be serviceable in contributing to the pleasure of the field.

THE PEREGRINE FALCON.[1]

In different stages of its growth the peregrine falcon has been known by various English names. Its proper appellation among the falconers is the slight falcon, the term falcon gentle being equally applicable to all the species when rendered manageable. The young bird of the year is called an eyess, not, as has been imagined, from the German ey, an egg, but from the French nias, which has the same signification as eyess, most of the terms of falconry having been adopted from the French. Several other instances

[1] *Falco Peregrinus*, Lin.

occur in our language, in which the initial *n* has detached itself from the substantive, and become permanently attached to the indefinite article. In the immature state this falcon is also called a red hawk, from the prevailing color of its plumage. When full grown and in a wild state it is called a haggard or passage falcon. The male is called a tiercel or tersel, to distinguish it from the female, which, among birds of prey, is most commonly one third larger than the male. Many of these terms are equally applicable to the other species used in hawking, and are only employed by the professors of that art, which is now fast going to decay. The following passage from Sir J. Sebright's Observations on hawking, published in 1826, will best illustrate its present condition.

"The village of Falconswaerd, near Bois le Duc, in Holland, has for many years furnished falconers to the rest of Europe. I have known many falconers in England, and in the service of different persons on the continent; but I never met with one of them who was not a native Falconswaerd. It has been the practice of these industrious and sober men, to stay with their employers during the season for hawking, and to pass the remainder of the year with their families at home."

What is known in the United States by the name of the great footed or duck hawk, is probably the same species known in Europe by the name of the peregrine falcon. It is said to attack ducks, and wild geese, striking them down with the projecting bone of its breast. According to Mr Audubon, it is more common in this country than formerly. It flies with astonishing rapidity; its nests are built in cedar swamps.

THE MERLIN[1]

Is in size little larger than the European blackbird, and is consequently the smallest of the hawk kind. Its bill is blue; the cere and irides are yellow; the head is of a rust color, streaked with black, and edged with rust color; the quill feathers are dark, tipped and margined in the inner webs with

[1] *Falco æsalon*, Tem

reddish white; the breast and belly are of a yellowish white, with streaks of rusty brown pointing downwards; the tail is long, and marked with alternate dusky and pale bars; the wings, when closed, do not reach quite to the end of the tail; the legs are yellow, and claws black.

Small as it is, this bird is not inferior in courage to any of the falcon tribe. It was formerly used for taking larks, partridges, and quails, which it would frequently kill by a single blow, striking them on the breast, head, or neck. It differs from the falcons, and all the rapacious kind, in the male and female being of the same size.

The courage of these creatures in general was such, that no bird, not very much above their own size, could terrify them; their swiftness so great, that scarce any bird could escape them; and their docility so remarkable, that they obeyed not only the commands, but the signs, of their master. They remained quietly perched upon his hand till their game was flushed, or else kept hovering round his head without ever leaving him but when he gave permission. The common falcon is a bird of such spirit, that, like a conqueror in a country, he keeps all birds in awe and in subjection to his prowess. Where he is seen flying wild, the birds of every kind, that seemed entirely to disregard the kite or the sparrow-hawk, fly with screams at his most distant appearance.

In order to train up a falcon, the master begins by clapping straps upon his legs, which are called jesses, to which is fastened a ring with the owner's name, by which, in case he should be lost, the finder may know where to bring him back. To these also are added little bells, which serve to mark the place where he is seen, if lost in the chase. He is always carried on the hand, and is obliged to be kept without sleeping. If he be stubborn, and attempts to bite, his head is plunged in water. Thus, by hunger, watching and fatigue, he is constrained to submit to having his head covered by a hood or cowl, which covers his eyes. This troublesome employment continues often for three days and nights without ceasing. It rarely happens but at the end of this, his necessities and the privation of light make him lose all idea of liberty, and bring down his natural wildness. His master judges of his being tamed when he permits his head to be covered without resistance, and when uncovered he seizes the meat before him contentedly. The repetition of these lessons by degrees insures success. His wants being the chief principle of his dependence, it is endeavored to increase his appetite by giving him little balls of flannel, which he greedily swallows. Having thus excited the appetite, care is taken to satisfy it; and thus gratitude attaches the bird to the man who but just before had been his tormenter.

When the first lessons have succeeded, and the bird shows signs of docility, he is carried out on some green, the head is uncovered, and, by flattering him with food at different times, he is taught to jump on the hand, and to continue there. When confirmed in this habit, it is then thought time to

make him acquainted with the lure. This lure is only a thing stuffed like the bird the falcon is designed to pursue, such as a heron, a pigeon, or a quail, and on this lure they always take care to give him his food. It is quite necessary that the bird should not only be acquainted with this, but fond of it, and delicate in his food when shown it. The use of this lure is to flatter him back when he has flown in the air, which he sometimes fails to do; and it is always requisite to assist it by the voice and the signs of the master. When the familiarity and the docility of the bird are sufficiently confirmed on the green, he is then carried into the open fields, but still kept fast by a string which is about twenty yards long. He is then uncovered as before; and the falconer calling him, at some paces distance, till he comes at last to fly to it. The next day the lure is shown him at a greater distance, till he comes at last to fly to it at the utmost length of his string. He is then to be shown the game itself alive, but disabled or tame, which he is designed to pursue. After having seized this several times with his string, he is then left entirely at liberty, and carried into the field for the purposes of pursuing that which is wild. At that he flies with avidity; and when he has seized it or killed it, he is brought back by the voice and the lure.

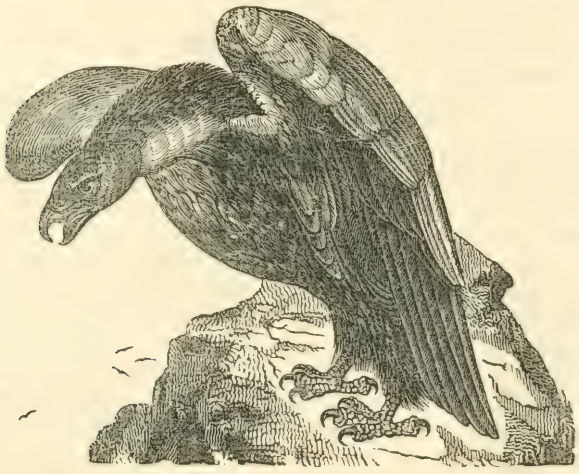
By this method of instruction, a hawk may be taught to fly at any game whatsoever; but falconers have chiefly confined their pursuit only to such animals as yield them profit by the capture, or pleasure in the pursuit. The hare, the partridge, and the quail, repay the trouble of taking them; but the most delightful sport is the falcon's pursuit of the heron, the kite, or the woodlark. Instead of flying directly forward, as some other birds do, these, when they see themselves threatened by the approach of the hawk, immediately take to the skies. They fly almost perpendicularly upward, while their ardent pursuer keeps pace with their flight, and tries to rise above them. Thus both diminish by degrees from the gazing spectator below, till they are quite lost in the clouds; but they are soon seen descending, struggling together, and using every effort on both sides; the one of rapacious insult, the other of desperate defence. The unequal combat is soon at an end; the falcon comes off victorious, and the other, killed or disabled, is made a prey either to the bird or the sportsman.

THE GOLDEN EAGLE[1]

Is one of the largest and noblest of all those birds that have received the name of eagle. The length of the female is three feet and a half; the extent of its wings, eight and a half; it weighs from sixteen to eighteen pounds but the male seldom weighs more than twelve pounds. Its bill is th

[1] *Falco fulvus*, GMEL.

inches long, and of a deep blue; and the eye of a very brilliant hazel color. The sight and sense of smelling are very acute. The head and neck are clothed with narrow, sharp-pointed feathers, of a deep brown color bordered with tawny; but those on the crown of the head, in very old birds, turn gray. The whole body, above as well as beneath, is of a dark brown; and the feathers of the back are finely clouded with a deeper shade of the same. The wings when clothed reach to the end of the tail. The quill feathers are of a chocolate color, the shafts white. The tail is of a deep brown, irregularly barred and blotched with an obscure ash color, and usually white at the roots of the feathers. The legs are yellow, short, and very strong, being three inches in circumference, and feathered to the very feet. The toes are covered with large scales, and armed with the most formidable claws, the middle of which are two inches long.



This eagle inhabits the highest mountains of the north of Europe and America, and preys on fawns, lambs, hares, and large birds. It soars to a prodigious height. An individual was kept at Vienna, which lived one hundred and four years.

In general all eagles are found in the mountainous and ill peopled countries, and breed among the loftiest cliffs. They choose those places which are remotest from man, upon whose possessions they but seldom make their depredations, being contented rather to follow the wild game in the forest, than to risk their safety to satisfy their hunger.

It requires great patience and much art to tame an eagle; and even though taken young, and brought under by long assiduity, yet still it is a dangerous domestic, and often turns its force against its master. When brought into the field for the purposes of fowling, the falconer is never sure

of its attachment; the innate pride, and love of liberty, still prompt it to regain its native solitudes; and the moment the falconer sees it, when let loose, first stoop towards the ground, and then rise perpendicularly into the clouds, he gives up all his former labor for lost; quite sure of never beholding his late prisoner more. Sometimes, however, they are brought to have an attachment for their feeder; they are then highly serviceable, and liberally provide for his pleasures and support. When the falconer lets them go from his hand, they play about and hover round him till their game presents, which they see at an immense distance, and pursue with certain destruction. They have, however, never been used in European falconry. It is only in the east that they have been so employed.

Of all animals the eagle flies highest, and on this account he was called by the ancients the Bird of Jove. When M. Ramond ascended Mont Perdu, in the Pyrenees, nearly three miles above the level of the sea, he saw a golden eagle far above him, dashing rapidly to windward against a strong gale. Of all birds, also, the eagle has the quickest eye; but his sense of smelling is far inferior to that of the vulture. He never pursues, therefore, but in sight; and when he has seized his prey, he stoops from his height, as if to examine its weight, always laying it on the ground before he carries it off. As his wing is very powerful, yet, as he has but little suppleness in the joints of the leg, he finds it difficult to rise when down; however, if not instantly pursued, he finds no difficulty in carrying off geese and cranes. He also carries away hares, lambs, and kids; and often destroys fawns and calves, to drink their blood, and carries a part of their flesh to his retreat. Infants themselves, when left unattended, have been destroyed by these rapacious creatures; which probably gave rise to the fable of Ganymede's being snatched up by an eagle to heaven.

An instance is recorded in Scotland of two children being carried off by eagles; but fortunately they received no hurt by the way; and, the eagles being pursued, the children were restored unhurt out of the nests to the affrighted parents.

The eagle is thus at all times a formidable neighbor; but peculiarly so when bringing up its young. It is then that the female, as well as the male, exert all their force and industry to supply their young. Smith, in his History of Kerry, relates, that a poor man in that country got a comfortable subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food, which were plentifully supplied by the old ones. He protracted their assiduity beyond the usual time, by clipping the wings, and retarding the flight of the young.

It happened some time ago, in the same country, that a peasant resolved to rob the nest of an eagle, that had built in a small island, in the beautiful lake of Killarney. He accordingly stripped and swam in upon the island, while the old ones were away; and, robbing the nest of its young, he was preparing to swim back, with the eaglets tied in a string; but, while he was

yet up to his chin in the water, the old eagles returned, and, missing their young, quickly fell upon the plunderer, and, in spite of all his resistance dispatched him with their beaks and talons.

In order to extirpate these pernicious birds, there is a law in the Orkney Islands, which entitles any person that kills an eagle, to a hen out of every house in the parish in which the plunderer is killed.

The nest of the eagle is usually built in the most inaccessible cliff of the rock, and often shielded from the weather by some jutting crag that hangs over it. Sometimes, however, it is wholly exposed to the winds, as well sideways as above; for the nest is flat, though built with great labor. It is said that the same nest serves the eagle during life; and indeed, the pains bestowed in forming it, seem to argue as much. It is asserted, that as soon as the young ones are somewhat grown, the mother kills the most feeble or the most voracious. If this happens, it must proceed only from the necessities of the parent, who is incapable of providing for their support, and is content to sacrifice a part to the welfare of the majority. After a male and female have paired, they remain together for life, and never change their place of abode.

The plumage of the eaglets is not so strongly marked as when they come to be adult. They are at first white; then inclined to yellow; and at last light brown. Age, hunger, long captivity, and diseases, make them whiter. It is said that they live above a hundred years; and that they at last die, not of old age, but from the beak turning inward upon the under mandible, and thus preventing their taking any food. They are indeed equally remarkable for their longevity, and for their power of sustaining a long absence from food. One of this species, which was lately nine years in the possession of Mr Owen Holland, of Conway, lived thirty-two years with the gentleman who made him a present of it; but what its age was when the latter received it from Ireland is unknown. The same bird also furnishes a proof of the truth of the other remarks; having once, through the neglect of servants, endured hunger for twenty-one days, without any sustenance whatever. But this is still less extraordinary than an instance recorded by Buffon, who was assured, by a person of veracity, that one of these birds being caught in a fox trap, existed for five entire weeks without aliment. It showed no appearance of languor till the last eight days, and it was killed at length in order to deliver it from its sufferings. The eagle seldom drinks, as its principal aliment is raw flesh, which contains in itself a sufficient quantity of moisture.

THE RING-TAILED EAGLE

Is probably the young of the golden eagle, though formerly considered a distinct species. When young, the body is of a lighter color than that bird, but deepens into a blackish brown as the eagle advances in age.

The tail feathers of this bird are highly valued by the various tribes of American Indians, for ornamenting their calumets or pipes of peace. The ring-tailed eagle is characterized as a generous spirited and docile bird. Its solitary habits, the vast inaccessible cliffs to which it usually retires, united with the scarcity of the species in those regions inhabited by man, all combine to render a particular knowledge of its habits very difficult to be obtained.

THE OSPREY EAGLE.[1]

This bird and the sea eagle have often been confounded with each other. They are, however, very different. The osprey, both male and female, is much smaller than the sea eagle; the *tarsi* of the osprey are scaly and naked, while those of the sea eagle are feathered part of the way; the osprey may be trained to catch fish for its keeper, but the sea eagle will not serve a master.

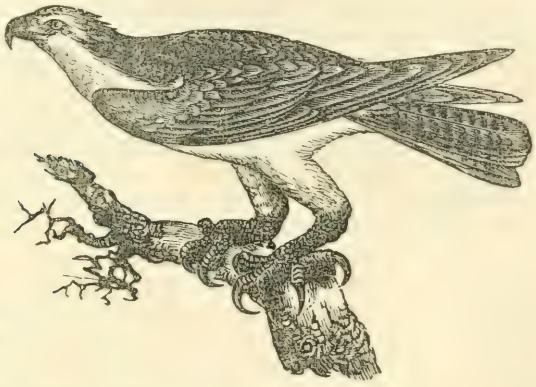
[1] *Falco haliætus*, Lin.

This eagle is common in Europe, and is probably the same with the individual known in the United States, by the name of the

AMERICAN FISH-HAWK.

We shall therefore introduce in this place, the description which our naturalists have given of the latter bird.

This is a formidable, vigorous winged, and well known bird, which subsists altogether on the finny tribes that swarm in our bays, creeks, and rivers; procuring his prey by his own skill and industry. It is doubtless the most numerous of all its genus within the United States. It penetrates far into the interior of the country, up our large rivers, and their head waters. It may be said to line the seacoast from Georgia to Canada.



The first appearance of the fish-hawk in spring is welcomed by the fishermen, as the happy signal of the approach of those vast shoals of herring, shad, &c., that enter our rivers in such prodigious multitudes. They see it active and industrious like themselves; inoffensive to the productions of their farms; building with confidence, and without the least disposition to concealment, in the middle of their fields, and along their fences; and returning regularly year after year to their former abode. Their nests are built of large sticks, corn-stalks, sea-weed, pieces of wet turf, and mullen stalks, lined with dry grass; the whole forming a mass very observable at half a mile's distance, and large enough to fill a cart, and form no inconsiderable a load for a horse. These materials are all put strongly together. During the time the female is sitting, the male frequently supplies her with fish. On the appearance of the young, the zeal and watchfulness of the parents are extreme. They stand guard, and go off to fish alternately; one parent being always within a short distance of the nest. On the near approach of any person, the hawk utters a plaintive whistling note, which

becomes snriller as she takes to wing and sails around, sometimes making a rapid descent, as if aiming directly for you, but checking her course, and sweeping past at a short distance over head, her wings making a loud whizzing in the air.

The flight of the fish-hawk, his manœuvres while in search of fish, and his manner of seizing his prey, are deserving of particular notice. In leaving the nest, he usually flies direct till he comes to the sea, then sails around in easy curving lines, turning sometimes in the air as on a pivot, apparently without the least exertion, rarely moving the wings; his legs extended in a straight line behind, and his remarkable length and curvature or bend of wing, distinguishing him from all other hawks. The height at which he thus elegantly glides is various, from one to two hundred feet, sometimes much higher, all the while calmly reconnoitering the deep below. Suddenly he is seen to check his course, as if struck by a particular object, which he seems to survey for a few moments with such steadiness, that he appears fixed in air, flapping his wings. This object, however, he abandons, and he is again seen sailing around as before. Now his attention is again arrested, and he descends with great rapidity; but ere he reaches the surface, shoots off on another course, as if ashamed that a second victim had escaped him. He now sails at a short height above the surface, and by a zigzag descent; and without seeming to dip his feet in the water, seizes a fish, which, after carrying a short distance, he probably drops or yields up to the bald eagle, and again ascends by easy spiral circles, to the higher regions of the air, where he glides about in all the ease and majesty of his species.

At once from this sublime ærial flight he descends like a perpendicular torrent, plunging into the sea with a loud rushing sound, and with the certainty of a rifle. In a few moments he emerges; bearing in his claws his struggling prey, which he always carries head foremost; and having risen a few feet above the surface, shakes himself as a water spaniel would do, and directs his heavy, laborious course directly for land. A shad was once taken from a fish-hawk near Great Egg harbor, on which he had begun to regale himself, the remainder of which weighed six pounds. Another hawk at the same place was seen with a flounder in his grasp, which struggled and shook him so that he dropped it on the shore. The flounder was picked up, and served a whole family for dinner. It is singular that the hawk never descends to pick up a fish which he happens to drop either on the land or on the water.

THE GREAT SEA EAGLE,[1]

Called the erne in Scotland, is usually above three feet in length, and the wings, when expanded, measure seven or eight feet. The bill, yellow at the base, is generally of a bluish black color towards the extremity. A blackish brown, deeper above than beneath, is the common hue of the bird, which is relieved by numerous white spots on the breast and under parts. Of his wings the larger feathers are nearly black, but those of the tail have a less deep tinge. It is found in the northern regions of both continents, even to the very margin of the polar ice, and in Asia as far to the south as the Caspian Sea. Fishing is the sea eagle's regular means of subsistence, but, on occasion, it will pick up dead fish on the beach, and attack seals and land animals. "Few exhibitions in nature," says the author of the British Naturalist, "are finer than the fishing of this powerful bird. Not adapted for walking into the shallow water for prey like the heron, the sea eagle courses over the surface. From her unapproachable haunt in the trees or the crags,—the latter is, when she can obtain it, her most admired residence—she darts forth with the straightness and fleetness of an arrow, and as she glides high in the air, scanning the expanse of miles with her clear and unerring vision, one or two motions of her wings are sufficient to elevate her almost above the reach of human eyes, or bring her down close to the

[1] *Falco albicilla*, Lin

surface of the water. When her prey appears within her reach, she pauses not an instant, but raising her broad wings upwards against the air, and thus taking advantage of the elasticity of both, shoots down as if discharged from a bow or an air-gun, makes the cliff echo to her cherup, and dashes upon the water with the same thunder and spray, as if a lightning-rent fragment had been precipitated from the height. For an instant the column of spray conceals her, but she soon ascends, bearing the prey in her talons, and a brief space elapses before she is lost in the distance."

As this eagle will eat carrion, it is used as a bait to catch him in Sutherlandshire. A minature house, or at least the wall part of it, is built on ground frequented by the eagle, and an opening left at the foot of the wall sufficient for the egress of the bird. To the outside of this opening a bit of strong cord is fixed, with a noose formed on one end, and the other end returning through the noose. After all this operation is finished, a piece of carrion is thrown into the house, which the eagle finds out and perches upon. It eats voraciously; and when it is fully satiated, it never thinks of taking its flight immediately upwards, unless disturbed, provided it can find an easier way to get out of the house; for it appears that it is not easy for it to begin its flight but in an oblique direction; consequently it walks deliberately out at the opening left for it, and the noose catches hold of and fairly strangles it.

THE WASHINGTON EAGLE.[1]

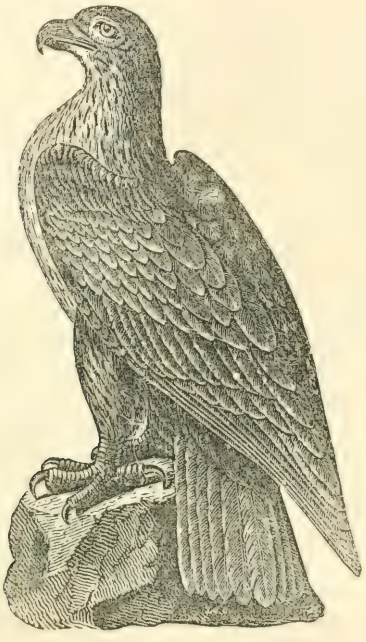
The discovery of this noble American bird, we owe to Mr J. J. Audubon, who considers it a new species, never before described by naturalists. There are many, however, who regard it as the sea eagle of Europe just described. Mr Audubon's discovery is thus related in his own words.

"It was on a winter's evening, in the month of February, 1814, that, for the first time in my life, I had an opportunity of seeing this rare and noble bird; and never shall I forget the delight it gave me. Not even Herschel, when he discovered the famous planet which bears his name, could have experienced more happy feelings. To have something new to relate, to become yourself a contributor to science, must excite the proudest emotions of the human heart.

"We were on a trading voyage, ascending the Upper Mississippi,—the keen winter blasts whistled over our heads, and the cold from which I suffered had, in a great degree, extinguished the deep interest which, at other seasons, this river has been wont to awake in me. I lay stretched beside our patroon; the safety of the cargo was forgotten, and the only thing that

[1] *Falco Washingtonianus*, Audubon.

called forth my attention was the multitude of ducks, of different species, accompanied by vast flocks of swans, which from time to time would pass us. My patroon, a Canadian, had been engaged many years in the fur trade; he was a man of much intelligence, who, perceiving that birds had engaged my curiosity, seemed only anxious to find some new object to divert me. The sea eagle flew over us. 'How fortunate!' he exclaimed; 'this is what I could have wished. Look, Sir! the great sea eagle, and the only one I have seen since I left the lakes.' I was instantly on my feet, and, having observed it attentively, concluded, as I lost it in the distance, that it was a



species quite new to me. My patroon assured me that such birds were indeed rare; that they sometimes followed the hunters, to feed on the entrails of animals they had killed, when the lakes were closed by the ice, but, when open, they would dive in the daytime after fish, and snatch them up in the manner of the fishing hawk; that they roosted generally on the shelves of the rocks, where they built their nests, of which he had discovered several by the quantity of white exuviæ scattered below. His account will be found to accord with the observations which I had afterwards an opportunity of making myself. Being convinced that the bird was unknown to naturalists, I felt particularly anxious to learn its habits, and in what particulars it

differed from the rest of its genus. Mr Wilson had confounded it with the bald or white headed eagle, one of the young of which he has given the figure of, to represent it. But I am strongly inclined to believe, that he never saw this bird; for it must be acknowledged that he was a very close and accurate observer, and, had he met with it, could hardly have fallen into so great an error, unless he was deceived by the near resemblance which the young of these two species bear to each other in plumage, although their difference in size is very great; but, in the old birds, the likeness ceases to exist; both in habits and appearance they are totally dissimilar.

The sea eagle of America is full one fourth larger in size, than any female specimen of the other kind I ever met with, old or young. In the United States, from Massachusetts to Louisiana on the seaboard, or as high as the mouth of the Missouri to the north-west, (I speak only of the extent of country I have visited, and where I have seen them,) these birds are very rare. This will appear to all, when I say that during my many long peregrinations, more than eight or nine I never found, and only one nest. The sea eagle of European naturalists, of which Mr Bewick has given a description, and also a figure, in a small wood cut, is more like the species in question, as to form and plumage, than any other. In mentioning this gentleman, I cannot forbear expressing the high estimation in which I hold his splendid productions; I have no hesitation in pronouncing him a most elegant and faithful copier of nature, and the very best illustrator of English ornithology. Mr Wilson's figure is not so well done; it seems to be taken from a stuffed specimen.

"My next meeting with this bird was a few years afterwards, whilst engaged in collecting cray-fish, in one of those flats which border and divide Green River, in Kentucky, near its junction with the Ohio, from the range of high cliffs which, for some distance, follow the meanders of the stream. I observed on the rocks, which, at that place, are nearly perpendicular, a quantity of white ordure. — Thinking that owls resorted thither, I mentioned it to my companions, when one of them, who lived within a mile and a half of the place, told me that it was from the nest of the brown eagle; meaning the young of the white-headed eagle, with which he was acquainted. I assured him this could not be; and remarked that the old, as well as young, of that species never built in such places, but always in trees. Although he could not answer my objection, he stoutly maintained that a brown eagle of some kind, above the usual size, had built there; he added that he had discovered the nest some days before, and had seen one of the old birds dive and catch a fish. This he thought strange, having, till then, always observed that brown and bald eagles procured this kind of food by robbing the fish-hawks; but if I felt particularly anxious to know what nest it was, I might soon satisfy myself, as the old birds would come and feed their young with fish; he had seen them do so before. In high expectation, I seated myself

about a hundred yards from the foot of the rock. Never did time pass more slowly; I could not help betraying the most impatient curiosity, for my hopes whispered it was a sea eagle's nest. Two long hours had elapsed before the old bird made his appearance, which was announced to us by the loud hissings of the two young ones, who crawled to the extremity of the hole to receive a fine fish. I had a perfect view of this noble bird as he held himself to the edging rock, his tail spread, and his wings partly so, and hanging something like the barn, bank, or social swallow. I trembled lest a word should escape from my companions; the slightest murmur had been treason from them; they entered into my feelings, and, although little interested, gazed with me. In a few minutes the other parent joined her mate, which, from the difference in size (the female being much larger,) we knew to be the mother bird. She, also, had brought a fish; but, more cautious than her mate, ere she alighted, she glanced her quick and piercing eye around, and instantly perceived her procreant bed had been discovered; she dropped her prey, with a loud shriek communicated the alarm to the mate, and, hovering with him over our heads, kept up a growling, threatening cry, to intimidate us from our suspected design. This watchful solicitude I have ever found peculiar to the female.

"The young having hid themselves, we went and picked up the fish which the mother had let fall; it was a white perch, weighing about five and a half pounds; the upper part of the head was broken in, and the back torn by the talons of the eagle. We had plainly seen her bearing it in the manner of the fish-hawk.

"This day's sport being at an end, as we journeyed homewards we agreed to return the next morning, being most anxious to procure both the old and young birds; but rainy and tempestuous weather setting in, our expedition was obliged to be postponed till the third day following, when, with guns and men all in readiness, we reached the rock. Some posted themselves at the foot, others upon it, but in vain. We passed the entire day, without either seeing or hearing an eagle; the sagacious birds, no doubt, having anticipated an invasion, had removed their young to fresh quarters.

"I come at last to the day I had so often and so ardently desired. Two years had gone by since the discovery of the nest in fruitless excursions; but my wishes were no longer to remain ungratified. In returning from the little village of Henderson, to the house of Dr R * * * * *, about a mile distant, I saw one rise from a small inclosure not a hundred yards before me, where the doctor had a few days before slaughtered some hogs, and alight upon a low tree branching over the road. I prepared my double-barrelled piece, which I constantly carry, and went slowly and cautiously towards him; quite fearless he awaited my approach, looking upon me with an undaunted eye. I fired, and he fell; before I reached him he was dead. With what delight I surveyed this magnificent bird! Had the finest salmon ever pleased him as he did me?—Never. I ran and presented him to my

friend, with a pride which those only can feel, who, like me, have devoted their earliest childhood to such pursuits, and have derived from them their first of pleasures; to others, I must seem 'to prattle out of fashion.' The doctor, who was an experienced hunter, examined the bird with much satisfaction, and frankly acknowledged he had never before seen or heard of it. The name I chose for this new species of eagle, 'The Bird of Washington,' may, by some, be considered as preposterous and unfit; but, being indisputably the noblest of the genus known to naturalists, I trust it will be allowed to retain it. To those, however, who may be curious to know my reasons, I can only say, that, as the new world gave me birth and liberty, the great man who insured its independence is next to my heart; he had such true nobility of mind, and honest generous feeling, as is seldom possessed; he was brave, so was the eagle; and his name, extending from pole to pole, resembles the majestic soarings of the mightiest of the feathered tribe.

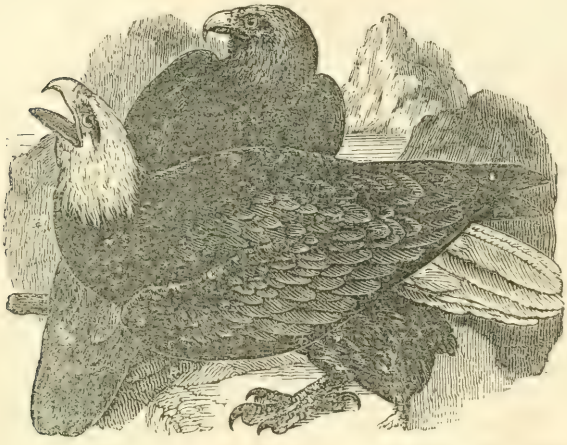
"During the month of January following, I saw a pair of sea eagles flying over the Falls of the Ohio, one in chase of the other. The next day I saw them again; the female had relaxed in her severity, had laid aside her coyness, and to a favored tree they continually resorted. I pursued them unsuccessfully for several days, when they forsook the place.

"The flight of this bird is very different from that of the white-headed eagle, encircling more diameter than the latter; whilst sailing, keeping nearer to the land and the surface of the water; and when about to dive for fish, falling in a circuitous spiral manner, as if with an intention of checking all retreating movement which its prey might attempt, and only when within a few yards darting upon it. The fish-hawk often does the same. When rising with a fish they fly to a considerable distance, forming, in their line of course and that of the water, a very acute angle, sometimes not exceeding thirty degrees, when several hundred yards distant from the spot emerged from. My last opportunity of seeing the sea eagle, was on the 15th of November, 1821, a few miles above the mouth of the Ohio; two passed over our boat, moving down in easy flappings. In a letter from a kind relation, Mr ***, dated 'Falls of the Ohio, July, 1819,' containing particulars relative to the swallow-tailed hawk (Fálco furcátus,) he also says, 'Yesterday, for the first time, I had an opportunity of viewing one of those magnificent birds, which you call the sea eagle, as it passed low over me, whilst fishing; I shall be really glad when I can again have the pleasure of seeing your drawing of it.' The glands containing the oil, used for the purpose of lubricating the surface of the plumage, were, in the specimen here represented, extremely large; the contents had the appearance of hog's fat which had been melted and become rancid. This bird makes more copious use of that substance than the white-headed eagle, or any of the Fálco genus, except the fish-hawk; the whole plumage looking, upon close examination, as if it had received a general coating of a thin clear dilution of

gum arabic, and presenting less of the downy gloss exhibited on the upper part of the bald-headed eagle's plumage. The male bird weighs fourteen and a half pounds avoirdupois, measures three feet seven inches in length, and ten feet two inches in extent.

"From the above account it will be seen that the bird here described, and faithfully figured from a fresh killed specimen, is a very scarce species, even in those parts where it is a native; and that it is rarely met with, the few opportunities I have had of seeing it, the dates of which I have generally given, are a sufficient proof."

WHITE-HEADED, OR BALD EAGLE.[1]



This distinguished bird has been long known to naturalists, being common to both continents, and occasionally met with from a very high northern latitude, to the borders of the torrid zone, but chiefly in the vicinity of the sea, and along the shores and cliffs of our lakes, and large rivers. Formed by nature for braving the severest cold; feeding equally upon the produce of the sea and of the land; possessing powers of flight capable of outstripping even the tempests themselves; unawed by any thing but man; and from the ethereal heights to which he soars, looking abroad, at one glance, on an immeasurable expanse of forests, fields, lakes, and ocean deep below him, he appears indifferent to the little localities of change of seasons; as in a few minutes he can pass from summer to winter, from the lower to the higher regions of the atmosphere, the abode of eternal cold; and thence

[1] *Falco leucocephalus*, Lin.

descend at will to the torrid or the arctic regions of the earth. He is therefore found at all seasons in the countries he inhabits, but prefers such places as have been mentioned above, from the great partiality he has for fish.

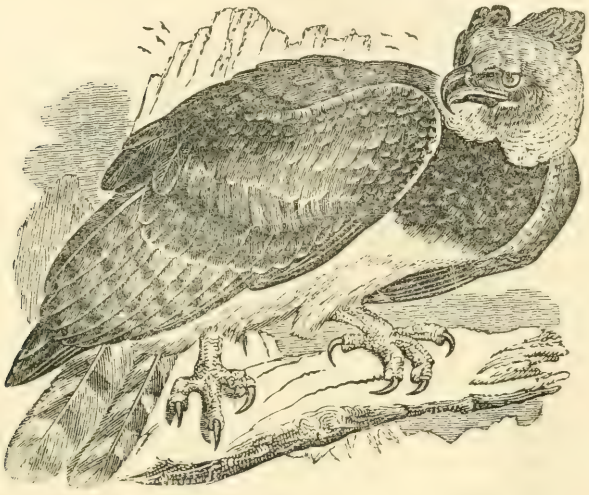
In procuring these he displays, in a very singular manner, the genius and energy of his character, which is fierce, contemplative, daring, and tyrannical; attributes not exerted but on particular occasions; but when put forth, overpowering all opposition. Elevated on the high dead limb of some gigantic tree, that commands a wide view of the neighboring shore and ocean, he seems calmly to contemplate the motions of the various feathered tribes that pursue their busy avocations below; the snow white gulls slowly winnowing the air; the busy tringæ coursing along the sands; trains of ducks streaming over the surface; silent and watchful cranes intent and wading; clamorous crows, and all the winged multitudes that subsist by the bounty of this vast liquid magazine of nature. High over all these hovers one, whose action instantly arrests all his attention. By his wide curvature of wing, and sudden suspension in air, he knows him to be the *fish-hawk*, settling over some devoted victim of the deep. His eye kindles at the sight, and balancing himself with half opened wings, on the branch, he watches the result. Down, rapid as an arrow from heaven, descends the distant object of his attention, the roar of its wings reaching the ear as it disappears in the deep, making the surges foam around! At this moment the eager looks of the eagle are all ardor, and levelling his neck for flight, he sees the fish-hawk once more emerge, struggling with his prey, and mounting in the air, with screams of exultation. These are the signals for our hero, who, launching into the air, instantly gives chase, soon gains on the fish-hawk, each exerts himself to the utmost to mount above the other, displaying in these rencontres the most elegant and sublime evolutions. The unencumbered eagle rapidly advances, and is just on the point of reaching his opponent, when, with a sudden scream, probably of despair and honest execration, the latter drops his fish; the eagle, poising himself for a moment, as if to take a more certain aim, descends like a whirlwind, snatches it in his grasp ere it reaches the water, and bears his ill-gotten booty silently away to the woods.

The predatory attacks and defensive manœuvres of the eagle and the fish-hawk, are matters of daily observation along the whole of our seaboard, from Georgia to New England, and frequently excite great interest in the spectators. Sympathy, however, on this as on most other occasions, generally sides with the honest and laborious sufferer, in opposition to the attacks of power, injustice, and rapacity; qualities for which our hero is so generally notorious, and which, in his superior *man*, are certainly detestable. As for the feelings of the poor fish, they seem altogether out of the question.

When driven, as he sometimes is, by the combined courage and perseverance of the fish-hawks, from their neighborhood, and forced to hunt for

himself, he retires more inland, in search of young pigs, of which he destroys great numbers. In the lower parts of Virginia and North Carolina, where the inhabitants raise vast herds of those animals, complaints of this kind are very general against him. He also destroys young lambs in the early part of spring; and will sometimes attack old sickly sheep, aiming furiously at their eyes.

HARPY EAGLE.[1]



This noble bird, the most magnificent of the eagle tribe, is distinguished from the other eagles, by the shortness of its wings, the extreme robustness of its legs, and the more than ordinary curvature of its beak and talons. Its upper mandible is remarkably thick at the base, from whence it is continued for some distance in a straight line, but suddenly curves downwards, with a strong arch toward the point, which is extremely sharp; the lower mandible is straight, short, and obtuse; the nostrils are transverse and oval; the wings do not reach when closed beyond the middle of the tail, which is rounded at the extremity; the legs are only partially feathered, on the upper part of their anterior surface, the remaining portion being naked and reticulated; and the talons are excessively powerful, the internal and the posterior in particular attaining an almost disproportionable length.

[1] *Harpyia destructor*, Cuvier.

The harpy is so bold, according to Hernandez, that it does not scruple to attack the most ferocious beasts, and even man himself; but this attribute is probably as much exaggerated as its docility, when he adds, that he may be tamed and trained to hawk as readily as the rest of the accipitrine tribe. He states also that it is quarrelsome, sullen, and fierce, and preys not merely upon birds, but upon hares, and other similar animals. Linnæus adds to this account, probably on the report of the keepers of the Spanish Menagerie, that it is capable of splitting a man's skull with a single blow of its beak. Mauduit states that he had been informed by travellers, that it commonly feeds upon the two species of sloth which are found in the forests of Guiana, and carries off in its talons fawns and other young quadrupeds. These details are confirmed by Sonnini, who describes it as living perfectly solitary in the depth and darkness of the thickest forests, where of course it is seldom disturbed by the prying eye of curiosity. He himself observed it perched on a lofty tree, on the banks of the Orassu, where it seemed altogether motionless, and uttered no cry. His shot having only broken his wing, he fastened it by one leg to his boat, in which position it remained for several days, displaying no symptoms of mischievousness, but constantly refusing all kinds of food. This was the specimen called by him aigle destructeur.

These scattered notices comprise all that is known of its history in its natural state. In captivity there is little to distinguish its manners from those of the other birds of its tribe. An individual taken from the nest, in possession of the elder Jacquin, became so tame as to suffer its head to be handled and scratched; but unfortunately this specimen was found dead on its passage to Europe, having fallen a victim, as was supposed, to the vengeance of the sailors, whose monkeys it had destroyed. These animals, in their gambols, unconsciously approached too near its cage, and were seized by its powerful talons; it devoured them with almost all their bones, but not without skinning them, an operation which it uniformly performed previously to consigning them to its maw.

THE CHILIAN SEA EAGLE.[1]

The beautiful species which we are about to describe, measures about two feet in length, from the point of the beak to the extremity of the tail, and from four to five in the expanse of its wings. No other individual, except that which is now in the Zoological Society's Collection, has, we believe ever been in Europe; and even in cabinets, the stuffed skin appears to be of considerable rarity. It was first made known to science by M. D'Azara, to whom we are indebted for the earliest descriptions of so many South

[1] *Haliætus aguia*, Temm.

American animals, as well as for the most authentic details with respect to their native habits. In the present instance he has unfortunately given us no such particulars; and as no other zoologist has seen the living bird in a state of nature, we can but judge from analogy that its manners are the same with those of the best known species of its genus. A figure taken from a preserved specimen, has been lately published by M. Temminck, in his splendid Planches Coloriées; and the description which accompanies it, is the only original notice of the bird subsequent to that of M. D'Azara.

The latter author, or rather his French translator, names it l'aigle noirâtre et blanc. He states, that it is found, but not frequently, in Paraguay, and that it is generally seen in pairs. The feathers of the head, neck, and upper part of the body, are, according to his description, of a blackish blue, and, with the exception of those of the back, terminated by dirty white. The tail is blackish, with small whitish spots scattered over its surface; the upper wing-coverts ash colored, with blackish stems and transverse lines of the same; and the large coverts, as well as the quill-feathers, of a deeper ash, variegated with narrow black bands. The whole under surface is beautifully white, with transverse blackish lines on the under tail-coverts, and larger wing-coverts alone; the smaller wing-coverts having no other part but their stems of this sombre tinge. The naked part of the leg is of a light yellow, with large flat scales both before and behind; the cere is pale yellow; the beak black at its point, and blue at the base; and the iris of a very light hazel.

THE WEDGE-TAILED EAGLE.[1]

The shape of the tail of this bird is peculiar to the continent of New Holland, to which country the wedge-tailed eagle appears exclusively to belong. Its general color is of a deep dusky brown or dull black. It is said to prey upon the emeus, and other large birds, and also on the young kanguroos. There is a living individual now in the possession of the Zoological Society, the only one that has been brought to Europe.

THE BRAZILIAN CARACARA EAGLE,[2]

So named from its hoarse and peculiar cry, is of a blackish brown color, with a light brownish gray neck, and the top of the head black. According to D'Azara, the full grown bird is twenty-one and a half inches in length,

[1] *Falco fuscosus*, Cuv.

[2] *Falco Braziliensis* Gmel.

and fifty in the expanse of the wings. Its range extends over a great part of South America, from Venezuela to Paraguay. It builds generally on the

tops of trees, but sometimes in a bushy thicket. It feeds on almost every sort of living creature.

THE GOSHAWK.[1]

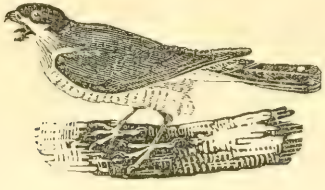
This bird is somewhat longer than the buzzard, but more slender and beautiful, and is one foot ten inches in length. Its bill is blue, tipped with black; the cere green; the eyes yellow; over each eye there is a whitish line; the head and all the upper parts of the body are of a deep brown color; and each side of the neck is irregularly marked with white; the breast and

[1] *Falco palumbarius*, Lin.

belly are white, with a number of wavy lines or bars of black; the tail is long, of an ash color, and crossed with four or five dusky bars; the legs are yellow, and the claws black; the wings are much shorter than the tail.—It feeds on mice and small birds, and eagerly devours raw flesh; it plucks the birds very neatly, and tears them into pieces before it eats them, but swallows the pieces entire; and frequently disgorges the hair rolled up in small pellets.

The goshawk is found in France and Germany; it is not very numerous in England, but is more frequent in Scotland, where it breeds in lofty trees, and destroys large quantities of game. It is also common in Russia, and Siberia. There is in Chinese Tartary a variety which is mottled with brown and yellow, and is used for sporting by the nobility.

THE SPARROW-HAWK.[1]



This bird is somewhat larger than a common pigeon, the male being about twelve inches in length, and the female fifteen. It has a short hooked blue bill, with yellow cere, slender reddish legs, and rather a long tail. The color of the eye is a bright orange. The plumage on the wings and upper parts of the body is brown, spotted with yellowish dun; the lower parts in some are whitish; in others of a russet color.

The sparrowhawk is very numerous in various parts of the world, from Russia to the Cape of Good Hope. The female builds in high rocks, lofty ruins, or hollow trees, but will sometimes condescend to take up with the old nest of a crow. Four or five is the number of eggs which she lays, and they are marked with reddish spots at the longer end. The sparrowhawk is more easily trained and made docile than most of the rapacious tribes, and when domesticated it is susceptible of great attachment to its owner. In its wild state it commits enormous havoc among the smaller race of birds, and it is an object of particular dislike to the farmer, as it sometimes makes destructive visits to the poultry yard, and is so daring that it is not to be intimidated from the pursuit of its prey even by the presence of mankind.

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[1] *Falco nisus*, Lin.

Of the buzzard, kite, and falcon kind, above seventy different species, foreign and domestic, have been enumerated. Of all these the nature and properties are nearly the same, and the description we have given of the jer-falcon, will apply to most of the hawk species, only differing in size and other minuter particulars; and that of the buzzard to the kites in general, with the same allowance. Of the foreign birds of these species, some are crested, and others have plumage differing from those of Europe.

THE AMERICAN SPARROW-HAWK[1]

is a constant resident in almost every part of the United States, particularly in the states north of Maryland. The habits and manners of this bird are well known. It flies rather irregularly. It perches on the top of a dead tree or pole in the middle of a field; and sits there in an almost perpendicular position, sometimes for an hour at a time, frequently jerking its tail, and reconnoitering the ground below, in every direction, for mice and lizards, &c. It approaches the farmhouse particularly in the morning, skulking about the barn-yard for mice or young chickens. It frequently plunges into a thicket after small birds, as if at random, but always with a particular and generally a fatal aim.

Though small snakes, mice, and lizards, be favorite morsels with this active bird, yet we are not to suppose it altogether destitute of delicacy in feeding. It will seldom or never eat of any thing that it has not itself killed; and even that, *if not in good eating order*, is sometimes rejected. A very respectable friend informs me, says Wilson, that one morning he observed

[1] *Falco sparverius*, LIN.

one of these hawks dart down on the ground, and seize a mouse, which he carried to a fence post; where, after examining it for some time, he left it; and a little while after pounced upon another mouse, which he instantly carried off to his nest in the hollow of a tree hard by. The gentleman, anxious to know why the hawk had rejected the first mouse, went up to it, and found it to be almost covered with lice, and greatly emaciated! Here was not only delicacy of taste, but sound and prudent reasoning.—"If I carry this to my nest," thought he, "it will fill it with vermin; and hardly be worth eating."

Many writers have spoken of this bird as inhabiting the West India islands, and especially Hispaniola, whence the species has been commonly known by the name of Saint Domingo hawks. Cayenne is given as its habitat by Brisson and Buffon; Paraguay, by D'Azara; and the Straits of Magellan, by Captain King. In the United States it usually builds in a hollow tree, and generally at a considerable distance from the ground, but in the south it is said to be more sociable, and D'Azara asserts that it will even take up its abode in churches and other old buildings. It lays from two to four or five eggs; and the young when hatched are fed with small birds, grasshoppers, and mice, the usual food of the parent birds.

The note of this bird is so exactly imitated by the blue jay, as to deceive even those acquainted with them both; and, whether through fear or fascination, no sooner does he make his appearance in their neighborhood, than the jays swarm around him and commence insulting him with their imitative cries. In return for this, as might naturally be expected, they fall frequent victims to his appetite.

THE BLACK HAWK[1]

Is a native of North America alone. It is a remarkably shy and wary bird, found most frequently along the marshy shores of large rivers; feeds on mice, frogs, and moles; sails much and sometimes at a great height; has been seen to kill a duck on the wing; sits by the side of the marshes on a stake for half an hour at a time, as if dozing; flies with great ease, and occasionally with great swiftness, seldom flapping his wings; is most numerous with us in winter, and but rarely seen in summer; is remarkable for the great size of its eye, length of its wings, and shortness of its toes. The breadth of its head is likewise uncommon. We have no account of its place or manner of breeding.

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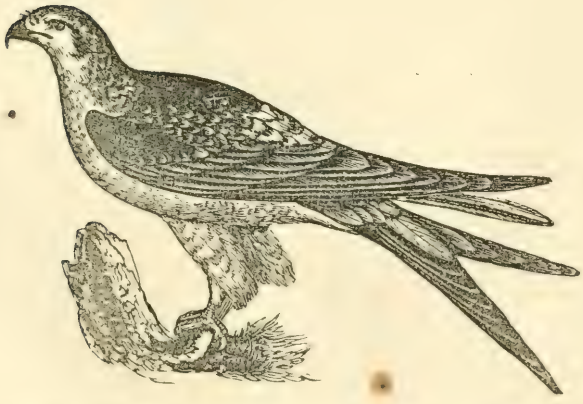
[1] *F. niger*, Wilson.

THE PIGEON HAWK[1]

Possesses great spirit and rapidity of flight. He is generally migratory in the middle and northern states, arriving in Pennsylvania early in spring, and extending his migrations as far north as Hudson's Bay. After building, and rearing his young, he returns to the south early in November. Small birds and mice are his principal food. When the reed birds, grak'es, and red-winged black birds congregate in large flights, he is often observed following in their rear, picking up the weak, the wounded, or the stragglers; and frequently making a sudden and fatal sweep into the very midst of their multitudes. The flocks of robins and pigeons are honored with the same attentions from this marauder, whose daily excursions are entirely regulated by the movements of the great body, on whose unfortunate members he fattens.

Sometimes, when shot at and not hurt, he will fly in circles over the sportsman's head, shrieking out with great violence, as if highly irritated. He frequently flies low, skimming a little above the field.

THE SWALLOW-TAILED HAWK[2]



Is a very elegant species, which inhabits the southern districts of the United States in summer. It is very abundant in South Carolina and Georgia, and still more so in West Florida, and the extensive prairies of Ohio and Indiana

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[1] *F. columbarius*, Lin. 58

[2] *F. furcatus*, Lin. 39

They feed on locusts, and on a species of lizard which is very numerous in that part of the country—and are said also to devour small green snakes. The flight of this bird is easy and graceful, with sometimes occasional sweeps among the trees.

THE COMMON BUZZARD,[1]

Which is one of the most widely known kinds of hawk in England, is about twenty inches in length, and four feet and a half in breadth, when measured across the expansion of the wings. The lower parts of the body are pale, varied with brown; on the upper parts dusky bars of a darker hue, mark the wings and tail, the latter of which is grayish beneath, and tipped with dusky white. The legs are yellow, the claws black, and the bill lead-colored, short, and hooked.

Though strong and active, the buzzard is so cowardly that he will fly even from the sparrow-hawk, and, when he is overtaken, will allow himself to be beaten, and cast to the ground, without making any resistance. His indolence is equal to his cowardice, as he will sit perched on the same bough during the greatest part of the day. Such is his laziness that he seldom constructs a nest, but contents himself with repairing the old nest of a crow, and lining it with wool and other soft materials. Rats, mice, and often all sorts of carrion, are his articles of subsistence.

It is but fair, however, that justice should be done to the good qualities of the buzzard. He may be tamed; and, in his domestic state, he manifests a very strong attachment to his owner. Buffon has given a highly amusing account of one which was reclaimed from the wild state by the Rector of St Pierre de St Belesme, and which displayed much of the sagacity and affection of a dog. "After having shut it up about six weeks," says he, "I began to allow it a little liberty, taking the precaution, however, to tie both the pinions of its wings. In this condition it walked out in my garden, and

[1] *Falco buteo*, Lin.

returned when I called it to feed After some time, when I judged that I could trust to its fidelity, I removed the ligatures; and fastened a small bell, an inch and a half in diameter, above its talon, and also attached to its breast a bit of copper, having my name engraved on it. I then gave it entire liberty, which it soon abused; for it took wing, and flew as far as the forest of Belesme. I gave it up for lost; but four hours afterwards, I saw it rush into my hall, pursued by four or five other buzzards, which had constrained it to seek again its asylum. After this adventure, it preserved its fidelity to me, coming every night to sleep on my window." It would also sit by and caress him at dinner, and follow him when he was on horseback. This bird had a remarkable antipathy to wigs, and particularly to red caps, which it never failed to snatch from the wearers, and deposit in a very high tree, that served as a store-house for its plunder. It is still more to the credit of the buzzard, that it is a most kind and assiduous parent; and Ray affirms that, should the female chance to be killed, the male will take charge of the young ones, and rear them till they can provide for themselves. The eggs of this bird are whitish, spotted with yellow.

THE MOOR BUZZARD.[1]

This bird is about twenty-one inches in length, with a black bill, and yellow cere and eyes. The whole crown of the head is of a yellowish white, lightly tinged with brown; the throat is of a light rust color; the rest of the plumage is of a reddish brown, with pale edges; the greater wing-coverts are tipped with white; the legs are yellow; and claws black.

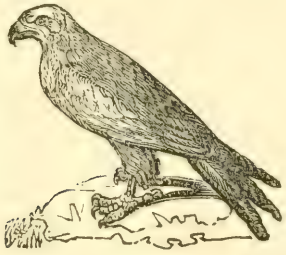
Rabbits, young wild ducks, and other waterfowl, are the prey of this bird, which will likewise feed on fish, frogs, reptiles, and even insects. Its haunts are in hedges and bushes, near pools, marshes, and rivers that abound with fish. It builds its nest a little above the surface of the ground, or in hillocks

[1] *F. rufus*, Lin.

covered with thick herbage; the female lays three or four eggs of a whitish color, irregularly sprinkled with dusky spots. Though smaller, it is more active and bold than the common buzzard, and when pursued, it faces its antagonist, and makes a vigorous defence.

Birds of this kind differ much; in some the crown and back part of the head being yellow; while some are uniformly of a chocolate brown, with a tinge of rust color.

THE KITE[1]



Is distinguished by his forked tail, and slow sailing flight, in which he seems perpetually on the wing. He is larger than the common buzzard. He has large eyes, yellow legs and feet, and black talons. The head and back are of a pale ash hue, which is varied across the shafts of the feathers by longitudinal lines. His neck is reddish; the feathers covering the inside of the wings are red, with black spots in the centre; and the lesser rows of the wing feathers are party-colored black, red, and white. He lives only upon accidental carnage, as almost every bird in the air is able to make good his retreat against him. He may be, therefore, considered as an insidious thief, who only prowls about, and, when he finds a small bird wounded, or a young chicken strayed too far from the mother, instantly seizes the hour of calamity, and, like a famished glutton, is sure to show no mercy. His hunger, indeed, often urges him to acts of seeming desperation. We have seen one of them fly round and round for a while to mark a clutch of chickens, and then on a sudden dart like lightning upon the unresisting little animal, and carry it off, the hen in vain crying out, and the boys hooting and casting stones to scare it from its plunder. For this reason, of all birds, the kite is the good housewife's greatest tormenter and aversion.

[1] *Falco milvus*, Lin.

THE ROUGH-LEGGED FALCON,[1]

Notwithstanding its formidable size and appearance, spends the chief part of the winter among our low swamps and meadows, watching for mice, frogs, lame ducks, and other inglorious game. Twenty or thirty individuals of this family have regularly taken up their winter quarters for several years past in the meadows below Philadelphia, between the Delaware and Schuylkill rivers, where they spend their time watching the banks like cats; or sailing low and slowly over the surfaces of the ditches. Though rendered shy by any attempt made to shoot them, they seldom fly far, usually from one tree to another at no great distance, making a loud squealing as they rise, something resembling the neighing of a young colt, though in a more shrill and savage tone.

This bird is common during winter in the lower parts of Maryland, and numerous in the extensive meadows below Newark, New Jersey; and are frequent along the Connecticut river. Their flight is slow and heavy. They take their station at daybreak near a ditch, bank, or haystack, for hours together, watching with patient vigilance for the first unlucky frog, mouse, or lizard, to make its appearance. The instant one of these is descried, the hawk, sliding into the air, sweeps over the spot, and in an instant has his prey grappled and sprawling in the air.

THE MISSISSIPPI KITE[2]

I first observed, says Wilson, a few miles below Natchez, where I found them in company with the turkey buzzard, whose flight it so exactly imitates as to seem the same species, in miniature. It sails about in easy circles, and at an immense height in the air. I observed numbers of this hawk sweeping about among the trees like swallows, in pursuit of the locusts that were in swarms on the trees, so that insects, it would appear, are the principal food of this species; but I do not doubt that mice, lizards, snakes, and small birds, furnish him with an occasional repast. This hawk is fourteen inches in length, and three feet in extent of wing. It is of an ash color, with a white neck and head.

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[1] *F. lagopus*, Lin. [2] *F. plumbeus*, Gmel.

THE MARSH HAWK[1]

Is, no doubt, the same species as the ring-tailed hawk of Europe. They are very common in New Jersey, where they are known by the name of mouse hawk. It is said, by Bonaparte, to be the young hen-harrier. They are most numerous in extensive meadows and salt marshes, over which they sail very low, making frequent circuitous sweeps over the ground, in search of a species of mouse, very abundant in such situations. It is said by European writers to build on the ground, or on the low limbs of trees. It is found at Hudson's Bay. It is particularly serviceable to the rice fields of the southern states, by the havoc it makes among the clouds of rice buntings that spread so much devastation among that grain. The planters consider one hawk to be equal to several negroes for alarming the rice birds.

THE RED-TAILED HAWK, OR BUZZARD,[2]

Inhabits the whole of the United States. Among the extensive meadows that border the Schuylkill and Delaware rivers below Philadelphia, where flocks of larks, and where mice and moles are in great abundance, many individuals of this hawk spend the greater part of the winter. Others prowl about the plantations, looking for vagrant chickens; their method of seizing which, is by sweeping swiftly over the spot; and then, grappling them with their talons, they bear them away to the woods.

THE AMERICAN BUZZARD[3]

Resembles the red-tailed hawk, in size and general aspect, but differs somewhat in color. It may perhaps on investigation be found to be the same. It is more numerous than the latter, but frequents the same situations in the winter. One, which was shot on the wing, lived several weeks, but refused to eat. It amused itself by frequently hopping from one end of the room to the other, and sitting for hours at the window, looking down on the passengers below. At first, when approached by any one, he drew back; but after some time, he became quite familiar, permitting himself to be handled, and shutting his eyes as if quite passive. Though he lived so long without food, he was found on dissection to be exceedingly fat.

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[1] *F. cyaneus*, Lin. [2] *F. borealis*, Gmel. [3] *F. buteoides*, Nuttall

THE EUROPEAN HORNED OWL, OR EAGLE OWL,[1]

At first view appears as large as an eagle, though when he comes to be observed more closely, he will be found much less, being but two feet in length. His eyes are large and transparent, encircled with an orange colored iris; his ears are large and deep; his plumage is of reddish brown, marked on the back with black and yellow spots, and yellow only upon the belly. To its offspring it is very affectionate, and if they are taken from the nest and confined, it will assiduously supply them with food. This, however, it accomplishes with such secrecy and sagacity, that it is almost impossible to detect it in the act. This bird has been seen in Scotland, and in Yorkshire, but is not common in England.

All birds of the owl kind have one common mark, by which they are distinguished from others; their eyes, like those of tigers and cats, are formed for seeing better in the dusk, than in the broad glare of sunshine. The pupil, in fact, is capable of opening very wide, or shutting very close; and, by contracting it, the brighter light of the day, which would act too

[1] *Strix bubo*, Lin. The genus *Strix* has the bill bent from its origin; base surrounded by a cere, covered wholly or in part by stiff hairs; head large, much feathered; nostrils lateral, pierced in the anterior margin of the cere, rounded, open, concealed by hairs directed forwards; eyes very large, orbits surrounded by feathers; legs feathered, often to the claws; three toes before and one behind, separate, the exterior reversible; the first wing feathers dentated on their exterior border, the third the longest.

powerfully upon the sensibility of the eye, is excluded; while, by dilating the pupil, the animal takes in the more faint rays of the night, and thereby is enabled to spy its prey, and catch it with greater facility in the dark.

But though owls are dazzled by too bright a daylight, yet they do not see best in the darkest nights, as some have been apt to imagine.

The nights when the moon shines are the times of their most successful plunder; for when it is wholly dark, they are less qualified for seeing and pursuing their prey; except, therefore, by moonlight, they contract the hours of their chase; and if they come out at the approach of dusk in the evening they return before it is totally dark, and then rise by twilight the next morning, to pursue their game, and to return, in like manner, before the broad daylight begins to dazzle them with its splendor.

Yet the faculty of seeing in the night, or of being entirely dazzled by day, is not alike in every species of these nocturnal birds. The common white or barn owl, for instance, sees with such exquisite acuteness in the dark, though the barn has been shut at night, and the light thus totally excluded, that it perceives the smallest mouse that peeps from its hole; on the contrary, the brown horned owl is often seen to prowl along the hedges by day, like the sparrow-hawk; and sometimes with good success. The note of the owl is not unpleasant. "A friend," says Mr White, "remarks that most of his owls hoot in B flat; but that one went almost half a note below A.—A neighbor of mine, who is said to have a nice ear, remarks that the owls about this village hoot in three different keys, in G flat, or F sharp, in B flat and A flat. He heard two hooting to each other, the one in A flat, and the other in B flat."

THE AMERICAN HORNED OWL.[1]

The great horned owl is found in almost every quarter of the United States. "His favorite residence, however, is in the dark solitudes of deep swamps, covered with a growth of gigantic timber; and here, as soon as evening draws on, and mankind retire to rest, he sends forth such sounds, as seem scarcely to belong to this world. Along the mountainous shores of the Ohio, and amidst the deep forests of Indiana, alone and reposing in the woods, this ghostly watchman has frequently warned me of the approach of morning, and amused me by his singular exclamations; sometimes sweeping down and around my fire, uttering a sudden *Waugh O! Waugh O!* sufficient to have alarmed a whole garrison. He has other nocturnal solos, no less melodious, one of which very strikingly resembles the half suppress-

[1] *Strix Virginiana*, Wilson.

ed screams of a person suffocated or throttled, and cannot fail of being exceedingly entertaining to a lonely benighted traveller, in the midst of an Indian wilderness."

This species inhabits the country round Hudson's Bay; and according to Pennant, (who considers it a mere variety of the eagle owl of Europe,) is found in Kamtschatka, extends even to the Arctic regions, where it is found white; and occurs as low as Astrachan. It has also been seen white in the United States, but this has been owing doubtless to disease. It preys on

young rabbits, squirrels, rats, mice, partridges, and small birds of various kinds. It has been often known to prowl about a farmhouse, and carry off chickens from roost. The great horned owl is not migratory, but remains with us the whole year. He is very rarely seen abroad by day, and never but when disturbed. The nest is generally placed in the fork of a tall tree and is constructed of sticks piled in considerable quantity, lined with dry leaves and a few feathers. The female lays four white eggs, nearly as large as those of a hen.

THE SNOWY OWL[1]

Is a native of the most northern regions of both continents, passing southward in the old as far as the latitude of Astracan, and in the new to that of

[1] *Strix nyctea*, Lin.

Pennsylvania, or more rarely even to the borders of Florida. It is very seldom, however, met with in Europe to the south of Sweden; while in America it appears to be most frequent in the latitude of Hudson's Bay. Bechstein mentions one or two instances of its appearance in the neighborhood of Leipsic and of Dresden; and it has obtained a place in the British Fauna, as an inhabitant of the islands of Orkney and Shetland, where it was first detected by Mr Edmonstone, about eighteen or twenty years ago. It seems probable, from that gentleman's observations, that it is stationary in the last mentioned locality throughout the year; but Wilson believes it to be only an occasional visitant in the United States, except perhaps in some of

the more northern and inland parts, when it may remain during the summer to breed. In the early part of the present year, (1832,) one of them was shot on an island in Boston harbor, where he had been noticed lurking for several days previous, feeding on clams, muscles, and other shellfish along the shore.

The comparative length of wing and strength of the quill feathers, in this beautiful owl, enable him to fly with much more swiftness, and to remain suspended in the air for a much greater length of time, than any other bird of the family. It flies abroad also in the daytime, as well as in the twilight, and in all these particulars, as well as in the nature of its food, evinces a striking approach to some of the more strictly diurnal birds of prey. It feeds almost indiscriminately on birds, quadrupeds, fishes, and even carrion; and is stated by Hearne to be extremely troublesome to the hunter, whom it will follow for a whole day, perching itself on the highest tree, and skimming down, when a bird has been shot with such rapidity as to carry off the prize

before the sportsman can get within reach of it. "They are," he adds, "so great a hindrance to those employed in the hunting service, that the same premium is given for one of their heads as for that of the hawk."

Wilson describes this bird as being particularly fond of frequenting the shores and banks of shallow rivers, sailing slowly over the surface, or sitting on a rock a little raised above the water, watching for fish, which it seizes with a sudden and instantaneous stroke of the foot, seldom missing its aim. It is capable of swallowing entire animals of considerable size, such as grouse, and partridges, young hares, and rabbits. Mr Bullock mentions an instance that came within his knowledge, in which a wounded individual disgorged a whole rabbit. According to Hearne, the female makes her nest upon the ground, and generally lays from three to four eggs, but seldom hatches more than two. The young are unable to fly before September; and the parents never migrate in search of a more temperate climate, but brave the coldest winters, even on the barren grounds, far from any shelter that might be derived from the woods. In such situations they perch on high rocks and stones, watching for their prey, their snowy plumage rendering them almost undistinguishable. Their voice is so dismal, that, as Pennant observes, it adds horror even to a Greenland winter.

THE WHITE, OR BARN OWL,[1]

Though so common in Europe, is much rarer in the United States than the preceding; and is only found here during very severe winters. This may possibly be owing to the want of those favorite recesses in this part of the world, which it so much affects in the Eastern Continent. The multitudes of old ruined towers, castles, monasteries, and cathedrals, that every where rise to view in those countries, are the chosen haunts of this well known species. Its savage cries at night give, with vulgar minds, a cast of supernatural horror to those venerable mouldering piles of antiquity. This species being common to both continents, doubtless extends to the arctic regions.

They feed eagerly upon the meadow mouse, which is found in the meadows below Philadelphia, and on the marshes along the seashore. Another favorite prey of this owl is the bat.

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[1] *Strix flammea*, Lin.

THE HAWK OWL[1]

Is a connecting link between the hawk and owl tribes. It has one strong trait of the hawk tribe in flying and preying by day, contrary to the general habit of owls. It is characterized as a bold and active species, following the fowler and carrying off his game as soon as shot. It is said to prey on partridges and birds, and is very common in Hudson's Bay. It is rare in the southern parts of the United States. Its favorite range seems to be along the borders of the arctic regions. Of their nest and manner of breeding we have no account. It is an inhabitant of both continents.

It is worthy of remark, that in all owls that fly by night, the exterior edges and sides of the wing quills are slightly recurved, and end in fine hairs or points; by which means the bird is enabled to pass through the air with the greatest silence, a provision necessary for enabling them the better to secure their prey. In the hawk owl, which flies by day, and to whom this contrivance would be of no consequence, it is accordingly omitted, or at least is scarcely observable.

THE RED OWL[2]

Is well known by its common name of the *little screech owl;* and noted for its melancholy quivering kind of wailing in the evening, particularly towards the latter part of summer and autumn, near the farmhouse. On clear moonlight nights they answer each other from various parts of the fields or orchards; roost during the day in thick evergreens, such as cedar, pine, or

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[1] *Strix funerea*, GMEL. [2] *S. asio*, LIN.

juniper trees, and are rarely seen abroad during the sunshine. They construct their nests in the hollow of a tree, often in the orchard in an old apple tree.

I kept one of these birds, says Wilson, in a room for several weeks. It was caught in a barn, and being unhurt, I had an opportunity of remarking its manners. At first it struck itself so forcibly against the window as frequently to deprive it, seemingly, of all sensation for several minutes; this was done so repeatedly that I began to fear that either the glass, or the owl's skull must give way. In a few days, however, it either began to comprehend the matter, or to take disgust at the glass; for it never repeated its attempts, and soon became quite tame and familiar. Those who have seen this bird only in the day, can form but an imperfect idea of its activity and even sprightliness in its proper season of exercise. Throughout the day it was all stillness and gravity; its eyelids half shut, its neck contracted, and its head shrunk seemingly into its body. But scarcely was the sun set and twilight began to approach, when its eyes became full and sparkling like two living globes of fire; it crouched on its perch; reconnoitered every object round with looks of eager fierceness; alighted and fed; stood on the meat with clenched talons, while it tore it in morsels with its bill; flew round the room with the silence of thought, and perching, moaned out its melancholy notes with many lively gesticulations, not at all accordant with the pitiful tone of its ditty, which reminded one of the shivering moaning of a half frozen puppy.

THE LITTLE OWL[1]

Is one of the least of its whole genus, but, like many other little folks, makes up in neatness of general form and appearance for deficiency of size, and is perhaps the most shapely of all our owls. It also possesses an eye fully equal in spirit and brilliancy to the best of them.

This species is a general and constant inhabitant of the middle and northern states; but is found most numerous in the neighborhood of the seashore, and among woods and swamps of pine trees. It rarely rambles much during the day; but if disturbed, flies a short way, and again takes shelter from the light; at the approach of twilight it is all life and activity, being a noted and dexterous mouse catcher. It is found as far north as Nova Scotia, and even Hudson's Bay, and is frequent in Russia. It builds its nest in a pine tree. The melancholy and gloomy umbrage of those solitary evergreens forms its favorite haunts, where it sits dozing and slumbering all day, lulled by the roar of the neighboring ocean.

[1] *S. passerina*, Wilson.

THE BURROWING OWL.

Differs essentially from all others in his habits and manners. Instead of hiding his head in the daylight, he fearlessly flies abroad in search of prey, in the broadest glare of the sun; and far from seeking abodes of solitude and silence, he lives in company with animals in the recesses of the earth, where they all enjoy the pleasures of fellowship and good harmony. The mounds of the prairie dog or marmot, which are thrown up in such numbers near the Rocky Mountains, are about eighteen inches in height. The entrance is by a passage two feet in length, which terminates in a comfortable cell composed of dry grass, where the marmot takes up his winter abode. Around these villages, the burrowing owls may be seen moving briskly about, singly or in small flocks. They seem to have very little fear of man, either soaring to a distance when alarmed, or descending into the burrows, where it is very difficult to come at them. In countries where the marmot is not found, this owl is said to dig a hole for himself. Their food appears to consist entirely of insects. Its note is similar to the cry of the marmot, which sounds like *cheh, cheh*, pronounced in rapid succession.

The burrowing owl is nine inches and a half long. The general color of the plumage is a light burnt umber, spotted with whitish. The under parts are white, banded with brown.

All this tribe of animals, however they may differ in their size and plumage, agree in their general characteristics of preying by night; their bodies are strong and muscular; their feet and claws made for tearing their prey; and their stomachs for digesting it. It must be remarked, however, that the digestion of all birds that live upon mice, lizards, or such like food, is not very perfect; for though they swallow them whole, yet they are always seen some time after to disgorge the skin and bones rolled up in a pellet, as being indigestible.

As they are incapable of supporting the light of the day, or at least of then seeing and readily avoiding their danger, they keep all this time concealed in some obscure retreat, suited to their gloomy appetites, and there continue in solitude and silence. The cavern of a rock, the darkest part of a hollow tree, the battlements of a ruined, unfrequented castle, or some obscure hole in a farmer's outhouse, are the places where they are usually found; if they be seen out of these retreats in the daytime, they may be considered as having lost their way; as having by some accident been thrown into the midst of their enemies, and surrounded with danger.

In this distress they are obliged to take shelter in the first tree or hedge that offers, there to continue concealed all day, till the returning darknes

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[1] *Strix cunicularia*, Bonap.

once more supplies them with a better plan of the country But it too often happens, that, with all their precaution to conceal themselves, they are spied out by the other birds of the place, and are sure to receive no mercy. The blackbird, the thrush, the jay, the bunting, and the redbreast, all come in file, and employ their little arts of insult and abuse. The smallest, the feeblest, and the most contemptible of this unfortunate bird's enemies, are then the foremost to injure and torment him. They increase their cries and turbulence round him, flap him with their wings, and are ready to show their courage to be great, as they are sensible that their danger is but small. The unfortunate owl, not knowing where to attack, or whither to fly, patiently sits and suffers all their insults. Astonished and dizzy, he only replies to their mockeries by awkward and ridiculous gestures, by turning his head, and rolling his eyes with an air of stupidity. It is enough that an owl appears by day to set the whole grove into a kind of an uproar. Either the aversion all the small birds have to this animal, or the consciousness of their own security, makes them pursue him without ceasing, while they encourage each other by their mutual cries to lend assistance in their laudable undertaking.

It sometimes happens, however, that the little birds pursue their insults with the same imprudent zeal with which the owl himself had pursued his depredations. They hunt him the whole day until evening returns; which restoring him his faculties of sight once more, he makes the foremost of his pursuers pay dear for their former sport; nor is man always an unconcerned spectator here. The bird catchers have got an art of counterfeiting the cry of an owl exactly; and, having before limed the branches of a hedge, they sit unseen, and give the call. At this, all the little birds flock to the place where they expect to find their well known enemy; but, instead of finding their stupid antagonist, they are stuck fast to the hedge themselves. This sport must be put in practice an hour before nightfall, in order to be successful; for if it is put off till later, those birds which but a few minutes sooner came to provoke their enemy, will then fly from him with as much terror as they just before showed insolence.

It is not unpleasant to see one stupid bird made in some sort a decoy to deceive another. The great horned owl is sometimes made use of for this purpose, to lure the kite, when the falconer desires to catch him for the purpose of training the falcon. Upon this occasion, they clap the tail of a fox to the great owl, to render his figure extraordinary; in which trim he sails slowly along, flying low, which is his usual manner. The kite, either curious to observe this odd kind of animal, or perhaps inquisitive to see whether it may not be proper for food, flies after, and comes nearer and nearer. In this manner he continues to hover, and sometimes to descend till the falconer, setting a strong winged hawk against him, seizes him for the purpose of training his young ones at home.

The usual place where the great horned owl breeds is in the cavern of a rock, the hollow of a tree, or the turret of some ruined castle. Its nest is near three feet in diameter, and composed of sticks, bound together by the fibrous roots of trees, and lined with leaves on the inside. It lays about three eggs, which are larger than those of a hen, and of a color somewhat resembling the bird itself. The lesser owl of this kind never makes a nest for itself, but always takes up with the old nest of some other bird, which it has often been forced to abandon. It lays four or five eggs; and the young are all white at first, but change color in about a fortnight. The other owls in general build near the place where they chiefly prey; that which feeds upon birds, in some neighboring grove; that which preys chiefly upon mice, near some farmer's yard, where the proprietor of the place takes care to give it perfect security. In fact, whatever mischief one species of owl may do in the woods, the barn owl makes a sufficient recompense for, by being equally active in destroying mice nearer home; so that a single owl is said to be more serviceable than half a dozen cats in ridding the barn of its domestic vermin. "In the year 1580," says an old writer, "at Hallontide, an army of mice so overrun the marshes near Southminster, that they ate up the grass to the very roots. But at length a great number of strange painted owls came and devoured all the mice. The like happened again in Essex about sixty years after."

ORDER II.—OMNIVOROUS BIRDS.

Birds of this order have the bill middle sized, robust, sharp on the edges; the upper mandible more or less convex, and notched at the point; feet with four toes, three before and one behind; wings of medium size, with the quill feathers terminating in a point.

THE HORNBILL.[1]

The rhinoceros hornbill, or rhinoceros bird, is nearly as large as the turkey; the bill is ten inches long, and two and a half thick at the base. On the upper part is an appendage as large as the bill itself, and turning upwards, which measures eight inches in height. There is nothing else remarkable in the bird, as the general color of the plumage is black. This bird is found in most parts of the East Indies, where (like the raven) it feeds

[1] *Buceros rhinoceros*, Lin. The genus *Buceros* has the bill convex, curved, sharp-edged, of large dimensions, serrated at the margin, with a horny protuberance near the base of the upper mandible rising into a crest; nostrils behind the base of the bill covered by a membrane; legs short, muscular; lateral toes equal, the external one united to the second joint; the first three wing feathers graduated, the fourth or fifth longest.

upon carrion. It is said to chase rats and mice, and, after pressing them flat with its bill in a peculiar manner, toss them up in the air, and swallow them whole on their descent.

THE HELMET HORNBILL[1]

Is remarkable for having the same prominence of a conical form; and in the Philippine Isles there is a species, the horn of which reaches backwards beyond the eyes, ending in two angular points, which produce the effect of a bird with two horns.

THE PIED HORNBILL, OR CALAO OF MALABAR.

The circumstance which distinguishes it from the rest of its kind, is, that the breast, belly, and a part of the wings are white; the remainder of the body is, like the rest of these animals, black.

There are about twelve species of the hornbill in all, one of which is white.

THE RAVEN.[2]

The raven is a bird found in every region of the world; strong and hardy, he is uninfluenced by the change of the weather; and when other birds seem numbed with cold, or pining with famine, the raven is active and healthy, busily employed in prowling for prey, or sporting in the coldest atmosphere. As the heats at the line do not oppress him, so he bears the cold of the polar countries with indifference. He is sometimes indeed seen milk-white, and this may probably be the effect of the rigorous climates of the north. A raven may be reclaimed to almost every purpose to which birds can be converted. He may be trained up for fowling like a hawk; he may be taught to fetch and carry like a spaniel; he may be taught to speak like a parrot; but the most extraordinary of all is, that he can be taught to sing like a man. I have heard (says a modern writer) a raven sing the black joke with great distinctness, truth, and humor.

Indeed, when the raven is taken as a domestic, he has many qualities that render him extremely amusing. Busy, inquisitive, and impudent, he

[1] *Buceros galeatus*, Latham.

[2] *Corvus corax*, Lin. The genus *Corvus* has the bill straight at its origin, thick, compressed on the sides, bent towards the point, and edged; nostrils covered by reflected bristly feathers; legs and feet plaited; toes three before and one behind, divided; tarsus longer than the middle toe; wings acuminated, the fourth feather longest.

goes every where, affronts and drives off the dogs, plays his pranks on the poultry, and is particularly assiduous in cultivating the good-will of the cook maid, who seems to be the favorite of the family. But then, with the amusing qualities of a favorite, he often also has the vices and defects. He is a glutton by nature, and a thief by habit. He does not confine himself to petty depredations on the pantry or the larder; he soars at more magnificent plunder; at spoils which he can neither exhibit nor enjoy; but which, like a miser, he rests satisfied with having the satisfaction of sometimes visiting and contemplating in secret. A piece of money, a tea-spoon, or a ring, are always tempting baits to his avarice; these he will slily seize upon, and, if not watched, will carry to his favorite hole.

In his wild state, the raven is an active and greedy plunderer. Nothing comes amiss to him. If in his flights he perceives no hope of carrion, (and his scent is so exquisite, that he can smell it a vast distance,) he then contents himself with more unsavory food, fruits, insects, and the accidental desserts of a dunghill. This bird chiefly builds its nest in trees, and lays five or six eggs of a pale green color, marked with small brownish spots.

Notwithstanding the injury these birds do in picking out the eyes of sheep and lambs, when they find them sick and helpless, a vulgar respect is paid for them as being the birds that fed the prophet Elijah in the wilderness. This prepossession in favor of the raven is of very ancient date, as the Romans themselves, who thought the bird ominous, paid it, from motives of fear, the most profound veneration. One of these that had been kept in the temple of Castor, as Pliny informs us, flew down into the shop of a tailor, who took much delight in the visits of his new acquaintance. He

taught the bird several tricks; but particularly to pronounce the name of the Emperor Tiberius and the whole royal family. The tailor was beginning to grow rich by those who came to see this wonderful raven, till an envious neighbor, displeased at the tailor's success, killed the bird, and deprived the tailor of his future hopes of fortune. The Romans, however, took the poor tailor's part; they punished the man who offered the injury, and gave the raven all the honors of a magnificent interment.

Birds in general live longer than quadrupeds; and the raven is said to be one of the most long lived of the number. Some of them have been known to live near a hundred years. This animal, indeed, seems possessed of those qualities that generally produce longevity, namely, a good appetite, and great exercise.

The raven is about two feet in length, and four in breadth of wing. Its bill is strong, and very thick at the base; it measures somewhat more than two inches and a half in length, and is covered with strong hairs or bristles, which extend above half its length, covering the nostrils; the general color of the upper parts is a fine glossy black, reflecting a blue tint in particular lights; the under parts are duller, and of a dusky hue.

The raven is a general inhabitant of the United States, but is more common in the interior. It is a remarkable fact, that where they abound, the common crow seldom makes his appearance.

THE CARRION CROW.[1]

This bird is about eighteen inches in length; its breadth above two feet. Crows are more numerous than ravens, and as widely spread. They live mostly in woods, chiefly in pairs, and build their nests on trees: the female lays five or six eggs much like those of a raven. They remain in England all the year. They feed on putrid flesh of all sorts; likewise on eggs, worms, insects, and various sorts of grain. Even pigeons, rabbits, chickens, and young ducks are not safe from their attacks. The crow is a

[1] *Corvus corone*, Lin.

bold bird; neither the kite, buzzard nor raven can approach its nest without being driven away; and when it has young, it will even fall upon the peregrine falcon, and bring it to the ground by a single stroke of the bill

It is a very common bird in the United States, and is more familiar in its habits in this country than in Europe.

THE ROOK[1]

Is about the size of the carrion crow, and, excepting its more glossy plumage, very much resembles it. The base of the bill and nostrils, as far as the eyes, is naked, in which it differs from all the rest, occasioned, it is said, by thrusting its bill into the earth in search of worms: but as the same appearance has been observed in such as have been brought up tame and unaccustomed to that mode of subsistence, we are inclined to consider it an original peculiarity. Rooks are useful in preventing a too great increase of that destructive insect the chafer or dor-beetle, and thereby make large recompense for the depredations they may occasionally commit on the corn-fields. They are gregarious, and fly in immense flocks at morning and evening to and from their roosting places in quest of food. During the breeding time they live together in large societies, and build their nests on the tallest trees close to each other, frequently in the midst of large and populous towns. These rookeries, however, are often the scenes of bitter contests; the new comers are frequently driven away by the old inhabitants, their half-built nests torn in pieces, and the unfortunate couple forced to begin their work anew in

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[1] *Corvus frugilegus*, Lin.

some more undisturbed situation. But though bad neighbors, the males are good husbands, as they begin to feed the hens before the latter commence laying, and continue to do so through the whole season of incubation. The rook is a bird of great sagacity. Dr Darwin remarks, that rooks are obviously more conscious of danger from mankind than most other birds are. Whoever has paid the least attention to them, may perceive that they are quite sensible of the danger being greater when a man is armed with a gun, than when he has no weapon with him. If, in the spring of the year, a person with a gun walk under a rookery, the inhabitants of the trees rise on their wings, and scream to the unfledged young to cower into their nests from the sight of the enemy. This uniformly occurs, and hence the country people assert that rooks can smell gunpowder. This bird is not a native of America.

THE JACKDAW.[1]

This bird is considerably less than the rook, being only thirteen inches in length. The head is large, and the bill long, in proportion to the body. The eyes are white, and the hinder part of the head and neck are of a hoary gray color; the rest of the plumage is of a fine glossy black above; beneath it has a dusky hue: the legs are black. It remains in England the whole year, and in great flocks frequents churches, old towers, and ruins, and sometimes, though rarely, even chimneys, hollow trees, and rabbit burrows, where it builds its nest: the female lays five or six eggs, paler than those of the crow, and smaller. Jackdaws are easily tamed, and may be taught to pronounce several words: they will conceal part of their food, and with it small pieces of money or toys. They feed on insects, grain, fruit, and small pieces of flesh, and are said to be fond of partridges' eggs. They have also been seen to catch fish.

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[1] *Corvus monedula*, Lin.

There is a variety of this bird in Switzerland, which has a white collar round its neck; and in Norway and other cold countries, they have been found perfectly white. They are not found in America.

THE MAGPIE[1]

Is about eighteen inches in length. The head, neck, and breast are of a deep black, finely contrasting with the snowy whiteness of the under parts; the neck feathers are very long, and extend down the back, leaving only a small space, of a grayish ash color, between them and the tail coverts, which are black; the plumage in general is glossed with green, purple, and blue, which catch the eye in different lights; the tail is very long and wedge-shaped; the under tail-coverts, thighs, and legs, are black; on the throat and part of the neck, there is a kind of feathers, mixed with the others, resembling strong whitish hairs. Indeed, were its other accomplishments equal to its beauty, few birds could be put in competition. Its black, its white, its green, and purple, with the rich and gilded combination of the

[1] *Corvus pica*, Lin.

glosses on its tail, are as fine as any that adorn the most beautiful of the feathered tribe. But it has too many of the qualities of a beau, to depreciate these natural perfections: vain, restless, loud, and quarrelsome, it is an unwelcome intruder every where; and never misses an opportunity, when it finds one, of doing mischief. It is a common bird in Europe and Asia, and in the western territories of the United States. It is remarkable that at the point where these birds are first encountered, in proceeding west, the blue jays disappear.

The magpie bears a great resemblance to the butcherbird in its bill, which has a sharp process near the end of the upper chap, as well as in the shortness of its wings, and the form of the tail, each feather shortening from the two middlemost. But it agrees still more in its food, living not only upon worms and insects, but also upon small birds, when they can be seized. A wounded lark, or a young chicken separated from the hen, are sure plunder; and the magpie will even sometimes set upon and strike a blackbird.

The same insolence prompts it to seize the largest animals when its insults can be offered with security. They are often seen perched upon the back of an ox or a sheep, picking up the insects to be found there, chattering and tormenting the poor animal at the same time, and stretch out their necks for combat, if the beast turns its head backward to apprehend them. They seek out also the nests of birds; and, if the parent escapes, the eggs make up for the deficiency. The thrush and the blackbird are but too frequently robbed by this assassin, and this in some measure causes their scarcity.

No food seems to come amiss to this bird; it shares with ravens in their carrion, with rooks in their grain, and with the cuckoo in their eggs: but it seems possessed of a providence seldom usual with gluttons; for when it is satisfied for the present, it lays up the remainder of the feast for another occasion. It will even in a tame state hide its food when it has done eating, and after a time return to the secret hoard with renewed appetite and vociferation.

In all its habits it discovers a degree of instinct unusual to other birds, its nest is not less remarkable for the manner in which it is composed, than for the place the magpie takes to build it in. The nest is usually placed conspicuous enough, either in the middle of some hawthorn bush, or on the top of some high tree. The place, however, is always found difficult of access; for the tree pitched upon usually grows in some thick hedgerow, fenced by brambles at the root; or sometimes one of the higher bushes is fixed upon for the purpose. When the place is thus chosen as inaccessible as possible to men, the next care is to fence the nest above, so as to defend it from all the various enemies of the air. The kite, the crow, and the sparrow-hawk are to be guarded against: as their nests have been sometimes plundered by the magpie, so it is reasonably feared that they will take the first opportunity to retaliate. To prevent this, the magpie's nest is built with surprising labor and ingenuity.

The body of the nest is composed of hawthorn branches; the thorns sticking outward, but well united together by their mutual insertions Within, it is lined with fibrous roots, wool and long grass, and then nicely plastered all round with mud and clay. The body of the nest being thus made firm and commodious, the next work is to make the canopy, which is to defend it above. This is composed of the sharpest thorns, woven together in such a manner, as to deny all entrance except at the door, which is just large enough to permit egress and regress to the owners. In this fortress the male and female hatch and bring up their brood with security, sheltered from all attacks but those of the climbing schoolboy, who often finds his torn and bloody hands too dear a price for the eggs or the young ones. The magpie lays six or seven eggs, of a pale green color, spotted with brown.

This bird, in its domestic state, preserves its natural character with strict propriety. The same noisy, mischievous habits attend it to the cage that marked it in the woods; and being more cunning, so it is a more docile bird than any other taken into keeping. Those who are desirous of teaching it to speak, have a foolish custom of cutting its tongue, which only puts the poor animal to pain, without improving its speech in the smallest degree. Its speaking is sometimes very distinct; but its sounds are too thin and sharp to be an exact imitation of the human voice, which the hoarse raven and parrot can counterfeit more exactly.

THE EUROPEAN JAY[1]

Is one of the most beautiful of the British birds. The forehead is white, streaked with black; the head is covered with very long feathers, which it can erect into a crest at pleasure; the whole neck, back, breast, and belly, are of a faint purple, dashed with gray; the wings are most beautifully barred with a lovely blue, black and white; the tail is black, and the feet of a pale brown. Like the magpie it feeds upon fruits, will kill small birds, and is extremely docile. The voice of the jay is harsh, grating, and unpleasant. Upon seeing the sportsman, he gives, by his cries, the alarm of danger, and thereby defeats his aim. The jay builds in woods, and makes an artless nest of sticks, fibres, and tender twigs; the female lays five or six eggs, of a grayish ash color, mixed with green, and faintly spotted with brown.

Like the magpie, the jay is talkative, and ready to imitate sounds. One of them has been known to mimic so exactly the noise made by the action of a saw, as to induce passengers to believe that a carpenter was at

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[1] *Corvus glandarius.* LIN.

work in the house. Another had learned, when cattle approached, to set a cur dog on them, by whistling and calling him by name. The poor jay, however, at last paid dearly for his mischievous tricks. Having set his quadruped associate upon a cow which was big with calf, the cow was much hurt, he was complained of as a nuisance, and his owner was obliged to destroy him.

THE AMERICAN BLUE JAY.[1]

This elegant bird is peculiar to North America, and is distinguished as a kind of beau among the feathered tenants of our woods by the brilliancy of his dress; and, like most other coxcombs, makes himself still more conspicuous by his loquacity and the oddness of his tones and gestures. He is almost a universal inhabitant of the woods, frequenting the thickest settlements as well as the deepest recesses of the forest, where his squalling voice often alarms the deer, to the disappointment of the hunter. In the charming season of spring, when every thicket pours forth harmony, the part performed by the jay always catches the ear. He appears to be among his fellow musicians, what the trumpeter is in a band, some of his notes

[1] *Corvus cristatus*, Lin.

bearing no distant resemblance to the tones of that instrument. These he has the faculty of changing through a great variety of modulations. When disposed for ridicule, there is scarcely a bird whose peculiarities of song he cannot tune his notes to. When engaged in the blandishments of love, they resemble the soft chatterings of a duck, and are scarce heard at some paces distant; but no sooner does he discover your approach, than he sets up a sudden and vehement outcry, flying off and screaming with all his might. His notes, a stranger might readily mistake for the repeated creakings of an ungreased wheelbarrow. All these he accompanies with various nods, jerks, and other gesticulations, for which the whole tribe of jays are so remarkable.

The blue jay builds a large nest on a cedar or apple tree. His favorite food is chesnuts, acorns, and Indian corn. He sometimes feeds on bugs and caterpillars, and often plunders orchards, cherry rows, and potato patches. He spreads alarm and sorrow around him, by robbing the nests of other birds; sucking the eggs, and frequently devouring the young. In times of great extremity, he will devour any animal substance that comes in his way.

Of all birds, he is the most bitter enemy to the owl. No sooner has he discovered the retreat of one of these, than he summons the whole feathered fraternity to his assistance, who surround the glimmering *solitaire*, and attack him from all sides, raising such a shout as may be heard half a mile off; the owl meanwhile returning every compliment with a broad goggling stare. The war becomes louder and louder, and the owl, at length forced to betake himself to flight, is followed by the whole train of his impudent persecutors, until driven beyond their jurisdiction. The jay is not only bold and vociferous, but possesses considerable talent for mimicry, and seems to enjoy great satisfaction in mocking and teazing other birds, particularly the sparrow-hawk, imitating his cry whenever he sees him, and squealing out as if caught. This soon brings a number of his tribe around him, who all join in the frolic, darting about the hawk, and feigning the cries of a bird sorely wounded; but this ludicrous farce often ends tragically. The hawk singling out one of the most insolent and provoking, sweeps upon him in an unguarded moment, and offers him up a sacrifice to his hunger and resentment. In an instant the tune is changed; all their buffoonry vanishes, and loud and incessant screams proclaim their disaster.

A blue jay which was brought up in the family of a gentleman in South Carolina, had all the tricks and loquacity of a parrot; pilfered every thing he could conveniently carry off, and hid them in holes and crevices; answered to his name with great sociability when called on, could articulate a number of words pretty distinctly: and when he heard any uncommon noise or loud talking, seemed impatient to contribute to the general festivity, by a display of all the oratorical powers he was possessed of.

This bird is eleven inches in length: his head is ornamented with a crest of light blue or purple feathers, which he can elevate or depress at pleasure. Whole upper parts light blue or purple, a collar of black passes down each side of the neck, and forms a crescent on the upper part of the breast. The under parts are white. The tail is long, and light blue, tipped with black.

CANADA JAY.[1]

This species inhabits the country from Hudson's Bay to the river St. Lawrence; also in winter, the inland parts of the state of Maine, and northern parts of the states of Vermont and New York. When the season is very severe with deep snow, they sometimes advance farther south; but generally return northward as the weather becomes mild. The character of this bird by the people of those parts of the country it inhabits, is, that it feeds on black moss, worms, and even flesh; when near habitations or tents, it pilfers every thing it can come at — is very bold, and comes even to the tents to eat meat out of the dishes; — watches the hunters while baiting their traps for martens, and devours the bait as soon as their backs are turned; that they breed early in the spring, building their nests on pine trees, forming them of sticks and grass; that they fly in pairs; lay up hoards of berries in hollow trees; are a kind of mock-bird; and when caught, pine away though their appetite never fails them. They are, we are informed, detested by the natives.

The Canada jay is eleven inches long, of a dull leaden gray color; the under parts are brownish white. The whole plumage on the back is long loose, and in great abundance.

STELLER'S JAY.[2]

This elegant bird is more than twelve inches long. The head, neck, and crest, and part of the back, are of a brownish black, the throat grayish, and the rest of the plumage of a beautiful blue. The feathers on the front of the head are tipped with blue. One specimen of this bird was shot near Columbia River, and another of more brilliant plumage, in Mexico. Of its habits little or nothing is known. It inhabits the western territories of the United States, beyond the Rocky Mountains; and is known on the coast of America, from California to Nootka Sound.

[1] *Corvus Canadensis*, Lin.

[2] *Corvus Stelleri*, Gmel.

FLORIDA JAY.[1]

This bird is eleven inches and a half long. The head, neck, wings, and tail are bright azure; the front bluish white, the back yellowish brown. The lower parts are yellowish gray. The Florida jay is not confined to that country, but is found in Louisiana, and extends northward to Kentucky. It is very abundant in East Florida, where it is found at all seasons in low bushes. Their notes are varied greatly, and resemble those of the thrush and blue jay. M. Ord, who has studied this species, says that they are quarrelsome, active, and noisy, and construct their nests in thickets. Their eggs he has not seen.

THE COLUMBIA JAY.[2]

This is the most splendid of the whole tribe of jays. It is thirty-one inches long, and twenty-six in the extent of wings. Its general color is bright blue, with purple reflections. The fore neck and anterior part of the neck are black, and the rest of the under parts white. The tail is very long, and the feathers of the head elongated into a crest. The individual from which Mr Audubon's drawing was made, was taken on the Oregon river. Nothing is known of its habits.

Many of the foreign birds of the jay kind are exceedingly beautiful. The Chinese jay is of two kinds, the red billed and that with a bluish bill. They are both elegant birds, their plumage being finely varied with patches of a fine velvet black, particularly about the head and throat. The Peruvian jay is of a tender green, which, by insensible shades, assumes a bluish cast in different parts of the body. The brown jay of Canada, and the Siberian jay are less remarkable. At Cayenne there are two other remarkable species, one of which has three white spots on each side of the head; and the other, which is called the yellow bellied jay, is further distinguished by a golden streak upon the crown of the head.

THE NUTCRACKER[3]

Is by some naturalists considered as of a distinct genus, by others it is classed with the crow; though in its manners it most resembles the jay,

[1] *Corvus Floridanus*, Audubon.

[2] *Corvus Bullockii*, Audubon.

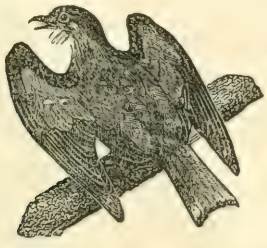
[3] *Nucifraga Caryocatactes*, Lin. This is the only individual of the genus; it is characterized by a bill long, straight, narrowed at the point, upper mandible rounded, longer than the under, both terminated in an obtuse and depressed point; nostrils basal, round, open, concealed by hairs directed forward; three toes before and one behind; tarsus longer than the middle toe; wings acuminated; fourth quill feather the longest.

laying up a store of nuts and acorns, and inhabiting the pine forests like that bird. It is of the size of a magpie, and the general color of its plumage is a rusty brown, marked with triangular white spots. They are very plenty in Germany, and are rarely seen in England.

THE RED-LEGGED CROW, OR CORNISH CHOUGH,[1]

Is like a jackdaw, but larger, and almost the size of a crow. The feet and legs are long, like those of a jackdaw, but of a red color; and the plumage is of a purplish black all over. It frequents rocks, old castles, and churches, by the seaside, like the daw, and with the same noisy assiduity. It is only seen along the western coasts of England. It is attracted by glittering objects, and has been known to take lighted pieces of wood from the fire. By tearing holes in the straw with its long bill, it does much injury to thatched houses.

THE ROLLER.[2]



The garrulous roller, so called from its chattering noise, is the only species with which the inhabitants of Europe are acquainted. It is of the size of a jay, and is exceedingly beautiful. The head, neck, and breast are of a light bluish green; the upper part of the body of a reddish brown; the tail is forked, and of a light blue; the legs are remarkably short. It is a bird of passage, common in Germany, but it seldom visits England.

[1] *Pyrrhocorax graculus*, Temm. The genus *Pyrrhocorax* has the bill of medium size, slender, compressed, bent, slightly notched or smooth; nostrils basal, lateral, ovoid, entirely concealed; legs strong; tarsus longer than the middle toe; toes almost wholly separated; claws strong and bent; cuneated; the fourth and fifth feathers longest.

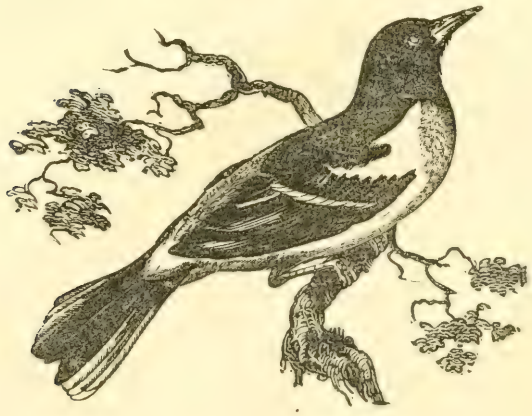
[2] *Coracias garrula*, Lin. The genus *Coracias* has the bill compressed, higher than broad, straight; the upper mandible bent towards the point; nostrils linear, lateral; legs short, stout, and formed for walking; three toes before and one behind, entirely divided; wings long, with the first quill somewhat shorter than the second.

The Chinese, the Cayenne, and the Abyssinian rollers, are all distinguished by the brilliancy of their plumage, but differ little in any material respect from the preceding.

THE ORIOLE.

Of the oriole there appears to be only one species known in Europe, that is by some termed the *Golden Oriole*.[1] It is the size of a thrush, and has been called the golden thrush and the witwal. The head and whole body of the male is of a rich yellow; the bill red; from that to the eye a black line; the wings black, marked with a bar of yellow, as are the ends of the feathers. The tail is black, with the end yellow. The body of the female is a dull green, with dusky wings and tail. The nest of this bird is of the shape of a purse, and rests upon the outermost twigs of tall trees. It is common in France, but has very rarely visited England.

THE BALTIMORE ORIOLE.[2]



From the singularity of the nest of this species, from its brilliant color, and its preferring the apple trees, weeping willows, walnut, and tulip trees

[1] *Oriolus galbula*, Lin. The genus *Oriolus* has a bill in the form of a lengthened cone, horizontally compressed at the base, and edged; the upper mandible surmounted by a ridge notched at the point; nostrils basal, lateral, naked, and horizontally pierced in a large membrane; tarsus shorter than, or of the same length as the middle toe, which is joined to the exterior one; wings with the first quill very short, the third the longest.

[2] *Oriolus Baltimore*, Wilson.

to build on, it is generally known; and is as usual honored with a variety of names, such as hang-nest, hanging-bird, golden robin, fire-bird, &c., but more generally the Baltimore bird. Few of the American orioles equal this in the construction of their nests; he gives them, in a superior degree, warmth, convenience, and security. He generally fixes on the high bending extremities of the branches, fastening strong strings of hemp or flax round two forked twigs; with the same materials he fabricates a strong, firm kind of cloth, not unlike the substance of a hat in its raw state, forms it into a pouch six or eight inches in depth, lining it substantially with soft substances well interwoven with the outward netting, and lastly finishes with a layer of horse hair; the whole being shaded from the sun and rain by a natural pent-house, or canopy of leaves.

The birds of this species have all a common form of building, but they do not build in exactly the same manner. Great difference will be found in the style, neatness, and finishing of the nest. Some are far superior workmen to others. So solicitous is the Baltimore to procure proper materials for his nest, that the women in the country must narrowly watch the thread that may be bleaching; and the farmer must secure his young grafts, as this bird will carry off the former, and the strings that tie the latter, to serve his purposes in building.

The principal food of the Baltimore consists of beetles, caterpillars, and bugs, particularly one of a brilliant glossy green. His song is a clear mellow whistle, repeated at short intervals, as he gleans among the branches. There is in it a certain wild playfulness and naiveté extremely interesting. It is not uttered with the rapidity of our eminent songsters, but with the pleasing tranquillity of a careless ploughboy, whistling merely for his own amusement. When alarmed by an approach to his nest, he makes a kind of rapid chirruping very different from his usual note. He inhabits North America, from Canada to Mexico, and is found as far south as Brazil. It is seven inches long; the head, throat, upper part of the back and wings are black; lower part of the back, and whole under parts are bright orange, deepening into vermilion on the breast; the back is also divided by a band of orange, the tail is black and orange. The plumage of the female is lighter and duller than that of the male. These birds are several years in completing their plumage.

ORCHARD ORIOLE.[1]

This bird has been described under a variety of names; as the spurious oriole, bastard oriole. It is a distinct species from the preceding, and differs from it in size, being less and more slender; in its colors, which are different; in the form of its bill and tail; in its notes, which are neither so full nor so mellow, and uttered with much more rapidity; in its mode of building, and the materials which it uses; and, lastly, in the shape and color of the eggs. Many mistakes have been occasioned by the change of color which these birds undergo, as they do not receive their full and perfect plumage till the fourth year. The young birds are easily raised from the nest, and soon become agreeable domestics. One which I reared and kept through the winter, whistled with great clearness and vivacity at two months old. It had an odd manner of moving its head and neck slowly, regularly, and in various directions, when intent on observing any thing, without stirring its body. This motion was as slow as that of a snake. When, at night, a candle was placed near its cage, it seemed extremely well pleased, fed and drank, drest, shook and arranged its plumage, sat as close to the light as possible, and sometimes chanted a few irregular notes, as I sat reading or writing beside it.

CROW BLACKBIRD.[2]

This noted depredator is well known to every farmer of the northern and middle states. In March, these birds come from the south; fly in loose flocks, frequent swamps and meadows, and follow in the furrows after the plough; their food at this season consists of worms, grubs, and caterpillars, of which they destroy prodigious numbers as if to recompense the husbandman beforehand for the havoc they intend to make in his crops of Indian corn. They build on tall cedar and pine trees in company; sometimes ten or fifteen nests being on the same tree. These are five inches in diameter; composed outwardly of mud, with long stalks and roots of grass, and lined with horse-hair.

The trees in which they build are near the farmhouses and plantations. From them they issue over the neighboring fields, and make their depreda-

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[1] *Oriolus mentatus*, Wilson.

[2] *Icterus versicolor*, Audubon. The genus *Icterus* has the bill longer than the head, or as long, straight, like an elongated cone, pointed, sharp, a little compressed, without distinct ridge or notch, the base covered by feathers; margin of the mandibles more or less bent inwards; nostrils basal, lateral, and covered by a hairy rudiment; tarsus as long as, or longer than the middle toe; wings long; third and fourth feathers longest.

tions. As soon as the blade of corn begins to make its appearance, the crow blackbirds hail it with screams of satisfaction, and descend on the fields, and begin to pull up and regale themselves on the seeds, scattering the green blades around. While thus eagerly employed, the vengeance of the gun sometimes overtakes them; but those

"——who live to get away,
Return to steal another day."

In the early times of New England, it was customary, in some towns, to require each inhabitant to kill a certain number of these birds yearly, a fine being imposed upon such as did not destroy and exhibit the requisite number.

When the young ears are in a milky state, they are attacked with redoubled eagerness by the grakles and red-wings. They descend on the corn like a blackening and sweeping tempest; dig off the external covering of the leaves, and having laid bare the ear, leave little behind to the farmer but the cobs and shrivelled skins. Whole acres of corn have been thus more than half ruined. During these depredations, the gun makes great havoc among them, which has no other effect than to send the survivors to another field. This system of plunder and retaliation continues till November, when they sheer off to the south, where they collect and darken the air with their numbers, which sometimes amount to a hundred thousand. They rise from the fields with a noise like thunder, and descend on the roads and fences; and when they rise and cover the high timbered trees, then destitute of leaves, they produce a most singular and striking effect; the whole trees seeming as if hung in mourning, their notes and screams, meanwhile, resembling the sound of a distant cataract, but in more musical cadence, swelling and dying away on the ear, according to the fluctuation of the breeze.

These birds are called by the farmers *crow blackbirds*, and are universally dreaded and detested. But if they do destroy the corn, they do nearly as much good as evil, by devouring numbers of noxious worms, grubs, and caterpillars, that infest the fields, which would, if not destroyed, desolate the country! The purple grakle is easily tamed, and sings in confinement. They have been taught to articulate several words. These birds are allowed by the fish-hawks to build in the interstices of his nest, where they all hatch their young, and live together in perfect harmony.

It is twelve inches long; on a slight view, it appears wholly black, but placed near, it appears of a rich, glossy steel blue, violet and green. The bill is more than an inch long, the upper mandible being very sharp. The female is of a sooty brown color.

THE STARE, OR STARLING.[1]

There are few birds better known in Europe, than that under our consideration. It has a nearer relation with the European blackbird than with any other; but it is as distinguished from that genus by the glossy green of its feathers, in some lights, and the purple in others. It breeds in hollow trees, the eaves of houses, towers, ruins, cliffs, often in high rocks over the sea. It lays four or five eggs, of a pale greenish ash color, and makes its nest of straw, small fibres of roots, &c. Its voice is rough; but what it wants in the melody of note, it compensates by the facility with which it is taught to speak. So fond is it of society, that it will join not only its own kind, but will also associate with redwings and fieldfares, and even with owls, jackdaws, and pigeons. In the winter season these birds fly in large flocks, and may be known at a great distance by their whirling mode of flight. M. de Buffon compares it to a sort of vortex, in which the whole collective body performs a uniformly circular revolution, yet progressively advances at the same time.

The principal food of starlings is snails, worms, and insects; but they will eat grain, seeds, and fruit, and are said to be exceedingly fond of cherries. When confined, they will eat raw flesh cut small, or bread soaked in water. They are accused, we know not how truly, of getting into pigeon houses, to suck the eggs, and it is certain that they do great damage in Lincolnshire, by roosting in myriads on the reeds, which are used for thatching in that country, and which they break down by their weight.

THE BIRD OF PARADISE.

This bird has been more celebrated for the false and imaginary qualities which are attributed to it, than for its real and truly remarkable properties. It has been reported of it, that the egg is produced in the air by the female, and hatched by the male in an orifice of its body; that it never touches the ground; that it has no legs; that it hangs itself by the two long feathers to a tree when sleeping; and that it is naturally without legs, and subsists entirely upon vapors and dew; with a variety of other assertions, equally false and equally ridiculous. There are about eight different species of

[1] *Sturnus vulgaris*, Lin. The genus *Sturnus* has the bill straight, in the form of an elongated cone, depressed, slightly obtuse; base of the upper mandible projecting on the forehead, the point much depressed, and without a notch; nostrils basal, lateral, half closed by an arched membrane; wings long, the first quill very short, the second and third ongest; three toes before, and one behind, the exterior joined at its base to the middle one.

these birds; but that which is best known is the *greater paradise bird*,[1] which appears to the eye of the size nearly of a pigeon, though in reality the body is not much larger than that of a thrush. The tail, which is about six inches, is as long as the body; the wings are large compared with the bird's other dimensions. The head, the throat, and the neck, are of a pale gold color. The base of the bill is surrounded by black feathers, as also the side of the head and throat, are as soft as velvet, and changeable like those of the neck of a mallard. The hinder part of the head is of a shining green, mixed with gold. The body and wings are chiefly covered with beautiful brown, purple, and gold feathers. The uppermost part of the tail feathers is of a pale yellow, and those beneath are white and longer than the former; for which reason the hinder part of the tail appears to be all white. But what chiefly excites curiosity are two long naked feathers, which spring from the upper part of the rump above the tail, and which are usually about two feet long

These are bearded only at the beginning and the end; the whole shaft, for about one foot nine inches, being of a deep black, while the feathered extremity is of a changeable color, like the mallard's neck.

This bird is a native of the Molucca Islands, but found in greatest numbers in that of Arou. The inhabitants are not insensible of the pleasure they afford, and give them the name of God's birds, as being superior to all that he has made. They live in large flocks, and at night generally perch upon the same tree. They are called by some, the swallows of Ternate from their rapid flight, and from their being continually on the wing in pursuit of insects, their usual prey.

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[1] *Paradisea apoda*, Lin. The genus *Paradisea* has the bill of medium size, straight, quadrangular, pointed, a little convex above, compressed: ridge between the feathers of the forehead; nostrils basal, marginal, open, but entirely concealed by the feathers; legs short; tarsus longer than the middle toe; lateral toe unequal, the internal one united to the second joint; back toe longer than the others, robust; wings with the five long feathers staged; the sixth or seventh longest.

As the country where they are bred has its tempestuous season, when rains and thunders continually disturb the atmosphere, these birds are then but seldom seen. The natives, who make a trade of killing and selling these birds to the Europeans, generally conceal themselves in the trees where they resort, and having covered themselves up from sight in a bower made of the branches, they shoot at the birds with reedy arrows; and, as they assert, if they happen to kill the king, they then have a good chance for killing the greatest part of the flock. The chief mark by which they know the king is by the ends of the feathers in his tail, which have eyes like those of a peacock. When they have taken a number of these birds, their usual method is to gut them, and cut of their legs. This has given rise to the fable above quoted; and the reason of this operation is, that the birds are used in that country as aigrettes, and for other ornaments of dress; and that being the case, it is usual to cut off the useless and less brilliant parts. They then run a hot iron into the body, which dries up the internal moisture; and filling the cavity with salts and spices, they sell them to the Europeans for a perfect trifle.

THE KING BIRD OF PARADISE[1]

Is about the size of a lark. The upper parts of the plumage are of a bright red, and the breast is a blood red color, with a broad green bar. The wing feathers are a little mottled with white and green, and the whole plumage has a fine gloss like satin. The tail is remarkably short, and from it spring two naked feathers, like those in the former species, except that they coil in a spiral manner at the end. It is supposed to breed in New Guinea, where there is also a species, the predominant color of which is black.

THE MAGNIFICENT BIRD OF PARADISE[2]

Is superior to all the preceding in the beauty of its plumage. It is the size of a blackbird. The crown of the head is a deep chesnut. At the back part of the neck a tuft of yellowish feathers arises, each of which is marked near the tip with a black spot; beneath these, springs another tuft

[1] *Paradisea regia*, Lin. [2] *Paradisea magnifica*, Shaw

still larger and of a straw color. The back and tail are of a bright red brown. Down the middle of the throat, neck, and breast, the color is blue green, which is encircled by a gorget (as it were) of black with a green shade. The long feathers from the tail are without tufts at the end, but are furnished with very short green webs on one side.

Besides these, there is the *gorget bird of paradise*, and some other species of less note.

ORDER III.—INSECTIVOROUS BIRDS.

Birds of this order have the bill middle sized, or short, straight, rounded, slightly edged or awl-shaped; upper mandible curved and notched at the point, most frequently furnished at the base with some coarse hair, pointing forward; feet with three toes, before and behind, articulated on the same level, the exterior united at its base, or to the first joint of the middle toe.

THE MISSEL THRUSH[1]

Is eleven inches in length, and weighing near five ounces. It differs scarcely in any other respect from the throstle, except that the spots on the breast are larger. It builds its nest in bushes, or on the side of some tree, as all of this kind are found to do, and lays four or five eggs in a season. Its song, which it begins in spring, sitting on the summit of a high tree, is not, however, so fine as that of the throstle. It is the largest bird of all the feathered tribe that has music in its voice; the note of all greater birds being either screaming, chattering, or croaking. It feeds on insects, holly, and misseltoe berries; and sometimes sends forth a very disagreeable scream when frightened or disturbed. It is very common in England, but is not found in America. While breeding, it is fierce and pugnacious, driving with great fury to a distance all birds that approach its nest. No jay, magpie, or blackbird, must enter the garden which is his haunt.

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[1] *Turdus viscivorus*, Lin. The genus *Turdus* has the bill middle sized, sharp edged, tip compressed, and recurved; upper mandible notched near the point; detached hairs at the opening of the mandibles; nostrils basal, ovoid, lateral, half concealed by a naked membrane; tarsus longer than the middle toe, to which last the outer is united at the base.

THE FIELDFARE[1]

Is known by his yellowish bill, by the dark color of his legs, and by his head being ash color, spotted with black. In the south of Europe they are insipid, tuneless birds, flying in flocks, and excessively watchful to preserve the general safety. All their season of music and pleasure is employed in the more northern climates, where they sing most delightfully, perched among the forests of maples, with which those countries abound.

The fieldfare is only a visitant in England, making its appearance about the beginning of October, in order to avoid the rigorous winters of the north, whence it sometimes comes in great flocks, according to the severity of the season, and leaves England about the latter end of February, or the beginning of March, and retires to Russia, Sweden, Norway, and as far as Siberia and Kamtschatka. They breed in Sweden and Norway. They build their nests in high trees, and sit on trees during the day, but always roost on the ground. During the winter they feed on haws and other berries; they likewise eat worms, snails, and slugs.

Fieldfares are sometimes seen singly, but, in general, form very numerous flocks, and fly in a body; and though they often spread themselves through the fields in search of food, they seldom lose sight of each other, but, when alarmed, fly off, and collect together upon the same tree.

There is reason, says Mr Bingley, to suppose that the flocks of these birds keep a kind of watch to remark and announce the appearance of danger. On any person approaching a tree that is covered with them, they continue fearless, till one, at the extremity of the bush, rising on its wings gives a loud and peculiar note of alarm. They will then fly away, except one other, which continues till the person approaches still nearer, to certify as it were the reality of the danger, and afterwards he also flies off, repeating the note of alarm.

The Roman epicures held these birds in such esteem, that they fattened them with crumbs of bread mixed with minced figs, and their flesh is still esteemed a delicacy.

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[1] *Turdus pilaris*, Lin.

THE THROSTLE, OR LONG THRUSH[1]

Is about eleven inches in length. The bill is dusky, the base of the lower bill yellow; the eyes are hazel; the head, back, and lesser coverts of the wings are of a deep olive brown, the latter tipped with white; the lower part of the back and rump are tinged with yellow; the cheeks are of a yellowish white, spotted with brown, as are also the breast and belly, which are marked with larger spots of a dark brown color; the quills are brown with pale edges; the tail feathers the same, the three outermost tipped with white; the legs are yellow; the claws black.

It begins to sing very early, often on the turn of the year, in blowing, showery weather, whence in some places it is called the storm cock, and its song is heard during nine months. Its note of anger is very loud and harsh, between a chatter and a shriek, which accounts for some of its names. Its usual strain, however, is among the sweetest of the grove, and is often kept up for hours without cessation. When brought up from the nest with the woodlark or the nightingale, it will adopt their song. It subsists on various sorts of berries, and likewise on caterpillars and several kinds of insects, with which it also feeds its young.

This bird is found in various parts of Europe, and is said to be migratory in some places, but continues in England the whole year, and frequently has two broods. It builds in woods or orchards, and not seldom in thick hedges near the ground. Fine and soft moss, interwoven with dried grass or hay, forms the outside of the nest, and the inside is curiously plastered with cow dung. In some districts of Poland, thrushes are caught in such numbers that the inhabitants export them in ship loads.

THE THRASHER, OR BROWN THRUSH.[2]

It is the largest of all the American thrushes, and is a well known and distinguished songster, and from the tops of hedge-rows, apple or cherry trees, he salutes the opening morning with his charming song, which is loud, emphatical, and full of variety. At that serene hour, you may plainly distinguish his voice at half a mile's distance. These notes are not imitative, but solely his own. Early in May, he builds his nest, choosing a thorn-bush, low cedar, thicket of briers, or cluster of vines for his situation. It is constructed of small sticks, dry leaves, and fine fibrous roots. He often attacks the black snake in defence of his young, and with success, as his bill is strong and powerful. His food consists of worms, caterpillars, beetles, and berries.

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[1] *Turdus musicus*, Lin.

[2] *Turdus rufus*, Lin.

He also destroys vast quantities of grubs, which he scratches from the ground. He is an active and vigorous bird, flying generally low from one thicket to another, with his long broad tail spread out like a fan; he has a single note or chuck when you approach his nest. He inhabits North America, from Canada to Florida. They are easily reared, and become very familiar in confinement.

The thrasher is eleven inches and a half long; the whole upper parts are of a bright reddish brown; lower parts yellowish white; the breast and sides are marked with pointed black spots, running in chains. The wings are crossed with two white bars.

THE MOCKING-BIRD.[1]

This extraordinary bird is peculiar to the new world, inhabiting a considerable portion of both North and South America. A warm climate and low country seem most congenial to their nature; they are therefore much more numerous in the southern than the northern states. The berries of the red cedar, myrtle, holly, gum berries, gall berries, and a profusion of others, with which the luxuriant swampy thickets of those regions abound, furnish

[1] *Turdus polyglottus*, Lin.

them with a perpetual feast. Winged insects, also, which abound there even in winter, form a favorite part of their food.

The mocking-bird builds his nest in different places, according to the latitude in which he resides. A solitary thorn bush; an almost impenetrable thicket; an orange tree, cedar, or holly bush, are favorite spots. Always ready to defend, but never over anxious to conceal his nest, he very often builds within a small distance of a house; and not unfrequently in a pear or apple tree, rarely higher than six or seven feet from the ground. The nest is composed of dry twigs, weeds, straw, wool, and tow, ingeniously put together, and lined with fine fibrous roots. During the time when the female is sitting, neither cat, dog, animal, or man, can approach the nest without being attacked. But the whole vengeance of the bird is directed against his mortal enemy, the black snake. Whenever this reptile is discovered, the male darts upon it with the rapidity of an arrow, dexterously eluding its

bite, and striking it violently and incessantly against the head, where it is very vulnerable. The snake soon becomes sensible of his danger, and seeks to escape; but the intrepid bird redoubles his exertions, and as the snake's strength begins to flag, he seizes and lifts it up from the ground, beating it with his wings, and when the business is completed, he returns to his nest, mounts the summit of the bush, and pours out a torrent of song in token of victory.

The plumage of the mocking-bird has nothing gaudy or brilliant in it: but that which so strongly recommends him is his full, strong, and musical

voice, capable of almost every modulation, from the mellow tones of the wood thrush, to the savage screams of the bald eagle. In his native groves, mounted on the top of a tall bush, in the dawn of a dewy morning, while the woods are already vocal with a multitude of warbles, his admirable song rises pre-eminent over every competitor. The ear can listen to his music alone. Nor is the strain altogether imitative. His own native notes are bold and full, and varied seemingly beyond all limits. They consist of short expressions of two, three, or five and six syllables, generally interspersed with imitations, all of them uttered with great emphasis and rapidity; and continued for an hour at a time with undiminished ardor. His expanded wings and tail, glistening with white, and the buoyant gaiety of his action, arresting the eye, as his song most irresistibly does the ear. He sweeps round with enthusiastic ecstasy,—he mounts and descends as his song swells or dies away—and as Mr Bartram has beautifully expressed it, "He bounds aloft with the celerity of an arrow, as if to recover or recall his very soul, expired in the last elevated strain." While thus exerting himself, a bystander would suppose that the whole feathered tribes had assembled together on a trial for skill—so perfect are his imitations.

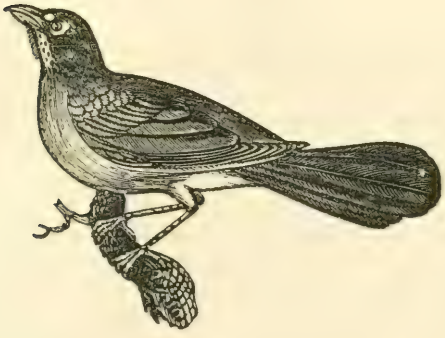
The mocking-bird loses little of the power and energy of his song by confinement. In his domesticated state, when he commences his career of song, it is impossible to stand by uninterested. He whistles for the dog, Cæsar starts up, wags his tail, and runs to meet his master. He squeaks out like a hurt chicken, and the hen hurries about with hanging wings and bristling feathers, clucking to protect her injured brood. The barking of the dog, the mewing of the cat, the creaking of the passing wheelbarrow, follow with great truth and rapidity. He repeats the tune taught him by his master, though of considerable length, fully and faithfully. He runs over the quiverings of the canary, and the clear whistlings of the Virginia nightingale, or red-bird, with such superior execution and effect, that the mortified songsters feel their own inferiority, and become silent, while he seems to triumph in their defeat by redoubling his exertions.

This excessive fondness for variety, however, in the opinion of some, injures his song. His elevated imitations of the brown thrush, are frequently interrupted by the crowing of cocks; and the warblings of the blue-bird, which he exquisitely manages, are mingled with the screaming of swallows, or the cackling of hens; amidst the simple melody of the robin, we are suddenly surprised by the reiterations of the whippoorwill; while the notes of the kildeer, blue jay, martin, Baltimore, and twenty others, succeed with such imposing reality, that we look round for the originals, and discover, with astonishment, that the sole performer in this singular *concert* is the admirable bird before us. Both in his native and domesticated state, during the solemn stillness of night, as soon as the moon rises in silent majesty, he begins his delightful solo, and serenades us the livelong night with a full

display of his vocal powers, making the whole neighborhood ring with his inimitable medley.

The mocking-bird is nine and a half inches long. The upper parts of the head, neck, and back, are a dark brownish ash; the under parts are of a brownish white. His figure is well proportioned, and handsome.

THE ROBIN.[1]



This well known bird is familiar to almost every body. Innumerable thousands of them are seen in the lower parts of the whole Atlantic states, from New Hampshire to Carolina. They migrate to avoid the deep snows, from north to south and from west to east. The robin builds a large nest on an apple tree, plasters it with mud, and lines it with fine grass. His principal food is worms, berries, and caterpillars. When berries fail, they disperse themselves over the fields, and along the fences, in search of worms and other insects.

The robin is one of our earliest songsters; even in March, while snow yet dapples the field, some few will mount a post or stake of the fence, and make short and frequent attempts at a song. His notes, in spring, are universally known, and as universally beloved. They are, as it were, the prelude to the grand general concert that is about to burst upon us, from woods, fields, and thickets, whitened with blossoms, and breathing fragrance. By the usual association of ideas, we therefore listen with more pleasure to this cheerful bird, than to many others of far superior powers, and much greater variety. Even his nest is held more sacred among school-boys than that of some others; and while they will exult in plundering a jay's or a cat-bird's,

[1] *Turdus migratorius*, Lin.

a general sentiment of respect prevails on the discovery of a robin's. He possesses much suavity of manners; and almost always seeks shelter for his young in summer, and subsistence for himself in the extremes of winter near the habitations of man.

The robin goes by several names at Hudson's Bay; some people calling him the red-bird; some the black-bird; and others the American fieldfare. They inhabit the whole of North America, from Hudson's Bay to Nootka Sound, and as far south as Georgia. They are too well known to require further description.

THE WOOD THRUSH.[1]

This sweet and solitary songster inhabits the whole of North America, from Hudson's Bay to Florida. With the dawn of morning, mounting to the top of some tall tree that rises from a thick shaded part of the woods, he pipes his few, but clear and musical notes in a kind of ecstasy, the prelude to which strongly resembles the double-tonguing of a German flute, and sometimes the tinkling of a small bell; the whole song consists of five or six parts, the last note of which is in such a tone as to leave the conclusion evidently suspended; the finale is finely managed, and with such charming effect, as to soothe and tranquillize the mind, and to seem sweeter and mellower at each successive repetition. Those who visit our woods, will be at no loss to recognize, from the above description, this pleasing musician. Even in dark, wet, and gloomy weather, when scarcely a single chirp is heard from any other bird, the clear notes of the wood thrush thrill through the dropping woods, from morning till night; and it may be truly said, that the sadder the day, the sweeter the song.

The favorite haunts of this bird are low, thick shaded hollows, through which a small brook or rill meanders, overhung with alder bushes that are mantled with wild vines. Near such a scene he generally builds his nest, in a laurel or alder bush, composed of dry leaves, grass, roots, and mud. Berries, beetles, and caterpillars are his principal food. The wood thrush measures eight inches in length. The whole upper parts are of a bright fulvous color, brightening into reddish on the head; the throat and breast are white

[1] *Turdus mustelinus*, Gmel.

THE CAT-BIRD.[1]

This is a very common and numerous species in the United States; and one as well known to all classes of people, as his favorite bicars, or blackberry bushes. In spring or autumn, on approaching thickets of brambles, the first salutation you receive is from the cat-bird; and a stranger, unacquainted with his note, would instantly conclude that some vagrant orphan kitten had got bewildered among the briers, and wanted assistance, so exactly does the call of the bird resemble the voice of that animal. He is unsuspicious, and extremely familiar; for whether in the woods or in the garden, where he frequently builds his nest, he seldom allows you to pass without paying his respects to you in the usual way. The nest is composed of dry leaves, weeds, small twigs, and fine dry grass, lined with fibrous roots. The birds show no great solicitude for concealment, though few are more interested for the safety of their nest and young. The eggs are four or five, of a bluish green color.

The cat-bird is one of our earliest songsters, beginning generally before break of day, and hovering from bush to bush with great sprightliness, when there is scarcely light enough to distinguish him. His notes are more remarkable for singularity than melody. They consist of short imitations of other birds, and other sounds; but his pipe being rather deficient in clearness and strength of tone, his imitations fail where these are requisite; yet he is not discouraged, but seems to study certain passages with great perseverance, uttering them at first low, and as he succeeds, higher, and more free; no ways embarrassed by the presence of a spectator, even within a few yards of him. On attentively listening to him for some time, you can perceive that he introduces into his performance all the odd sounds, and quaint passages he has been able to collect. Upon the whole, he merits a place among the most agreeable of our *general* performers.

Few people in the country respect the cat-bird. On the contrary, it is generally the object of dislike; and the boys of the United States entertain

[1] *Turdus lividus*, Wilson.

great prejudice and contempt for this bird, its nest, and young. The principal cause of this dislike, seems to be some similarity of taste, and clashing of interest, between the bird and the farmer. The cat-bird is fond of large ripe garden strawberries; so is the farmer, for the good price they bring in market. The cat-bird loves the best and richest early cherries; so does the farmer, for they are sometimes the most profitable of his early fruit. The cat-bird has a particular partiality for the finest ripe mellow pears; and these are also particular favorites of the farmer. But the cat-bird has frequently the advantage of the farmer, by snatching off the *first fruits* of these delicious productions; and the farmer takes revenge, by shooting him down with his gun, as he finds old hats and scare-crows are no impediments in his way to these forbidden fruits, and nothing but this resource can restrain his visits. The boys are now set to watch the cherry trees with guns; and thus commences a train of prejudices and antipathies, that commonly continue through life.

The cat-bird measures nine inches in length; at a small distance he appears nearly black; but it is of a deep slate color, and the tail-coverts are deep red. The female differs little from the male.

WATER THRUSH.[1]

This bird is remarkable for its partiality to brooks, rivers, shores, ponds, and streams of water; wading in the shallows in search of aquatic insects, wagging the tail almost continually, chattering as it flies. It is exceedingly shy, darting away on the least attempt to approach it, and uttering a sharp chirp, as if exceedingly alarmed. The cane-brakes, swampy river shores, and deep watery solitudes of Louisiana, Tennessee, and the Mississippi territory, possess them in abundance; there they are eminently distinguished by the loudness, sweetness, and expressive vivacity of their notes, which begin very high and clear, and at last are hardly articulate. At these times, the musician is perched on the middle branches of a tree over the brook or river bank, pouring out his charming melody, that may be distinctly heard for nearly half a mile. The voice of this little bird is exquisitely sweet and expressive.

[1] *Turdus aquaticus*, Wilson.

THE SUPERB MENURA.[1]

This singular bird is a native of New Holland. It is about the size of the hen-pheasant; its length is three feet and a half from the point of the beak to the longest tail feather; the general color is brown; the tail consists of sixteen feathers, twelve of which are very curiously webbed.

THE SHRIKE, OR BUTCHER-BIRD.[2]

The habits of the butcher-bird seem to correspond with its conformation, and it lives as well upon flesh as upon insects, and thus partakes in some measure of a double nature. Its appetite for flesh, however, is the most prevalent; and it never takes up with the former when it can obtain the latter. This bird, therefore, leads a life of continual combat and opposition. As from its size it does not much terrify the smaller birds of the forest, so it very frequently meets birds willing to try its strength, and it never declines the engagement. In Russia it is trained for catching small birds, like a falcon.

It is wonderful to see with what intrepidity this little creature goes to war with the pie, the crow, and the kestril, all above four times larger than itself. It not only fights upon the defensive, but often comes to the attack, and always with advantage, particularly when the male and female unite to protect their young, and to drive away the more powerful birds of rapine. At that season, they do not wait the approach of their invader; it is sufficient that they see him preparing for the assault at a distance. It is then that they sally forth with loud cries, wound him on every side, and drive him off with such fury, that he seldom ventures to return to the charge. In these disputes they generally come off with the victory; though sometimes happens that they fall to the ground with the bird they have so fiercely

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[1] *Menura superba.* This is the only one of the genus. It is characterized by a bill at its base broader than deep, straight, and somewhat slender, inclined at the point, which is notched, and furnished at the base with setaceous plumes, pointing forwards; lower mandible shortest; nostrils oval, large, covered with a membrane, and situated in the middle of the bill; claws as long as the toes, broad, convex above, obtuse; wings short, concave.

[2] *Lanius excubitor,* Lin. The genus *Lanius* has the bill middle sized, robust, straight from its origin, and much compressed; upper mandible strongly bent towards the tip, which is hooked, the base destitute of a cere, and furnished with rough hairs pointing forwards; nostrils basal, lateral, almost round, half closed by an arched membrane, and often partly concealed by hairs; tarsus longer than the middle toe; three toes before and one behind, separate; the third and fourth wing feathers longest.

fixed upon, and the combat ends with the destruction of the assailant as well as of the defender.

For this reason, the most redoubtable birds of prey respect them; while the kite, the buzzard, and the crow, seem rather to fear than seek the engagement. Nothing in nature better displays the respect paid to the claims of courage, than to see this little bird, apparently so contemptible, fly in company with the lanner, the falcon, and all the tyrants of the air, without fearing their power or avoiding their resentment.

As for small birds, they are his usual food. He seizes them by the throat, and strangles them in an instant. His name of nine-killer he derives from the popular belief that he catches small birds to the number of nine, and impales them on a thorn, before he begins to tear them to pieces to satisfy his hunger. The fact is, that he pays no such attention to the regularity of number, but, being a bold bird, capable of killing much bigger birds than himself, he hangs his prey on a thorn, as a butcher does a beast on a hook, that he may dissever it with more convenience to himself.

During summer, such of them as constantly reside here, (for the smaller red butcher-bird migrates,) remain among the mountainous parts of the country; but in winter they descend into plains and nearer human habitations. The larger kind make their nests on the highest trees, while the lesser build in bushes in the fields and hedge-rows. They both lay about six eggs, of a white color, but encircled at the larger end with a ring of brownish red. The nest on the outside is composed of white moss, interwoven with long grass; within, it is well lined with wool, and it is usually fixed among the forking branches of a tree. The female feeds her young with caterpillars and other insects while very young; but soon after accustoms them to flesh, which the male procures with surprising industry. Their nature also is very different from other birds of prey in their parental care; for, so far from driving out their young from the nest to shift for themselves, they keep them with care; and even when adult, they do not forsake them, but the whole brood live in one family together. Each family lives apart, and is generally composed of the male, female, and five or six young ones; these all maintain peace and subordination among each other, and hunt in concert. It is easy to distinguish these birds at a distance, not only from their going in companies, but also from their manner of flying, which is always up and down, seldom direct or sideways.

Of these birds there are above forty different kinds, foreign and domestic, but the *great cinereous butcher-bird* is the least known in Europe. The little butcher-bird, or red-backed shrike,[1] which is called a *flusher*, is about the size of a lark, and has a large head. The back and upper side of his wings are of a rusty color; the throat and breast white, with red spots, and the head and rump cinereous.

[1] *Lanius collurio*, GMEL.

The *woodchat* resembles the former, except in the color of the back which is brown, and not red, as in the other

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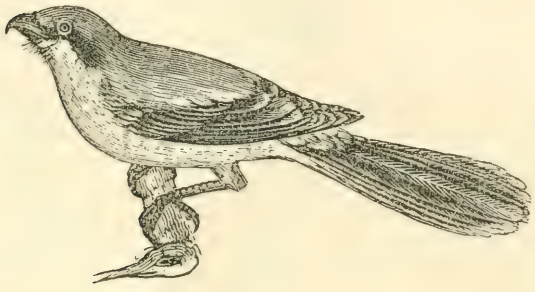
THE GREAT AMERICAN SHRIKE.



The form and countenance of this bird bespeak him full of courage and energy; and his true character does not belie his appearance, for he possesses these qualities in an eminent degree. It is not yet decided whether it be the same as the cinereous shrike of Linnæus; its habits and manners appear to be the same.

This bird frequents the deepest forests; builds a large, compact nest, of dry grass and moss, in the upright fork of a small tree. In his manners he has more resemblance to the pies than to birds of prey, particularly in the habit of carrying off his surplus food, as if to hoard it for future exigencies; with this difference, that the pies conceal theirs at random in holes and crevices, where perhaps it is forgotten; while the shrike sticks his on thorns and bushes, where it shrivels in the sun, and soon becomes useless to the hoarder. One of these birds had once the temerity to pursue a snow-bird into an open cage which stood in a garden; and, before any one could arrive to its assistance, had already strangled and scalped it, though he lost his liberty by the exploit. In confinement, he sticks up not only insects, but flesh, and the bodies of such birds as are thrown to him, on nails and sticks fixed up for the purpose.

The character of the butcher-bird is entitled to no small degree of respect. His activity is visible in all his motions; his courage and intrepidity beyond every other bird of his size, (the king-bird excepted,) and in affection for his young, he is surpassed by no other. He associates with them, the whole family hunting in company. He attacks the largest hawk or eagle in their

defence, with a resolution truly astonishing, so that all of them respect him, and on every occasion decline the contest. As the snows of winter approach, he descends from the mountainous forests and from the regions of the north, to the more cultivated parts of the country, hovering about our hedge-rows, orchards, and meadows, and disappears again early in April.

THE SPOTTED FLYCATCHER.[1]

The tribes of flycatchers are so named from living on insects. The spotted flycatcher, however, eats fruit, and is on that account called, in some parts of England, the *cherry sucker*. It is, in general, of a mouse color, the head spotted with black, and the wings and tail edged with white. Of all the European summer birds it is the most mute and the most familiar; it also appears the last of any. It builds in a vine or a sweet-brier, against the wall of a house, or in the hole of a wall, or on the end of a beam or plate, and often close to the post of a door where people are going in and out all day long. This bird does not make the least pretensions to song; but uses a little inward, warning note, when it thinks its young in danger from cats or other annoyances. It takes its stand on the top of some stake or post, from whence it springs forth on its prey, catching a fly in the air, and hardly ever touching the ground, but returning still to the same stand, for many times together.

THE PIED FLYCATCHER.[2]

This bird is about five inches long. It has a black beak, hazel eyes, and white forehead; the top of the head, the back, tail, and legs, are black; the rump is dashed with ash color; the wing-coverts are dusky, and the greater coverts are tipped with white; the exterior sides of the secondary quills are white, as are also the outer feathers of the tail, and all the under parts, from the bill to the tail. The female is much smaller than the male, but has a

[1] *Muscicapa grisola*, Lin. The genus *Muscicapa* has a bill strong, angular, depressed at the base, compressed towards the point, which is curved and much notched; base furnished with long and stiff hairs; nostrils basal, lateral, ovoid, partly covered by hairs tarsus as long as the middle toe; lateral toes almost equal.

[2] *Muscicapa albicollis*, Tem

longer tail; is brown where he is black; and has not the white spot on the forehead. They are most plentiful in Yorkshire, Lancashire, and Derby-

shire. Their nests are built in holes of trees. The parent birds incessantly feed their young with small flies, which they catch very expertly.

THE KING-BIRD, OR TYRANT FLYCATCHER,[1]

Sometimes called the field marten, is a well known bird in the United States. The name king, as well as tyrant, has been bestowed on this bird for its extraordinary behavior in breeding time, and for the authority it assumes over all other birds. His extreme affection for his mate, nest, and young, makes him suspicious of every bird that comes near his residence, so that he attacks every intruder without discrimination; his life at this season is one continued scene of broils and battles; in which, however, he generally comes off conqueror. Hawks and crows, the bald eagle, and the great black eagle, all equally dread a rencontre with this merciless champion, who, as soon as he perceives one of these last approaching, launches into the air to meet

[1] *Muscicapa tyrannus*, Bonap.

him, mounts to a considerable height above him, and darts down on his back, sometimes fixing there to the great annoyance of his sovereign, who, if no convenient retreat be near, endeavors, by various evolutions, to rid himself of his merciless adversary, but the king-bird is not so easily dismounted. He teazes the eagle incessantly, sweeps upon him, and remounts, that he may descend on his back with greater violence; all the while keeping up a shrill and rapid twittering. The purple marten, however, is sometimes more than a match for him; and the red-headed wood-pecker is seen to amuse himself with the violence of the king-bird, and play bo-peep with him round a rail, while the latter, highly irritated, makes every attempt to strike him, but in vain.

He annoys the farmer very much by his partiality to bees. He plants himself on a post of the fence near the hives, and makes great havoc among these industrious insects. But the cultivator may be assured that this bird is greatly his friend, in destroying multitudes of insects and their larvæ, which prey on the harvests of his fields. He often takes his stand in fields of pasture, on the tops of mullen and other rank weeds, near the cattle, and makes sweeps after passing insects, particularly the large black gadflies, so terrifying to horses and cattle. His eye moves restlessly about him, traces the flight of an insect, then that of a second, and even a third, till he sees one to his liking, when with a shrill sweep he pursues it, seizes it and returns to the same spot, to look out for more. He hovers over the river for a considerable time, darting after insects, snatching them from the surface of the water, and diving about in the air like a swallow; for he possesses, at will, great powers of wing. His flight is much like that of a hawk. Beside insects, he feeds on various sorts of berries, particularly blackberries, of which he is extremely fond.

The general color of this bird is a dark slaty ash; the throat and lower parts are pure white; the plumage on the head, though not forming a crest, is frequently erected, and discovers a rich bed of orange color, called by the country people his crown; when the feathers lie close, this is concealed.

THE GREAT-CRESTED FLYCATCHER[1]

Is not so well known as the preceding, being chiefly confined to the woods There, his harsh *squeak*, (for he has no song,) is heard above most others He also visits the orchard, is equally fond of bees, but wants the courage and magnanimity of the king-bird. He builds his nest in a hollow tree deserted by the blue-bird or woodpecker. The materials of which this is

[1] *Muscicapa crinita*, LIN.

formed, are somewhat scantier. It is formed of a little loose hay, feathers of the Guinea fowls, hogs' bristles, pieces of cast snake skins, and dogs' hair Whether he surrounds his nest with the snake skin by way of *terrorem*, to prevent other birds or animals from entering, or whether it be that he finds its silky softness suitable for his young, is uncertain; the fact, however, is notorious. It feeds on whortleberries, while they last.

It is eight inches and a half long; the upper parts are dull greenish olive, the feathers on the head are pointed, and form a sort of crest; the throat and breast ash color; the rest of the lower parts a sulphur yellow.

THE PEWIT FLYCATCHER[1]

Is one of our earliest spring visitants. Its notes, like those of the blue-bird, are pleasing, not for any melody they contain, but for the ideas of spring and returning verdure, with all the sweets of this lovely season, which are associated with his simple but lively ditty, which is nothing but *pewée, pewittitee, pewée*, for a whole morning. It begins to build in March, on some projecting part under a bridge, in a cave, in a well, often under a shed in the low eaves of a cottage, and in such places. The nest is composed of mud mixed with moss, lined with flax and horse-hair, and is generally large and solid. This bird is six inches and a half in length; the upper parts are dusky olive; whole lower parts a pale delicate yellow; the plumage of the head is loose and crested.

THE SMALL BLUE-GRAY FLYCATCHER,[2]

If it were not for the length of the tail, would rank next to the humming-bird in magnitude. It is four inches and a half long; the plumage above is of a light bluish gray; below, bluish white; the wings brownish black. Its motions are quick; he seems always on the look-out for insects; darts about from one part of the tree to another with hanging wings, and erected tail, making a feeble chirping *tsee, tsee*, no louder than a mouse. Though so small, it is ambitious of hunting on the highest branches, and is seldom seen among the humbler thickets. It fixes its nest among the twigs on the top of a high tree; this is formed of the stems of old leaves, the husks of buds, the withered blossoms of weeds, coated with dry lichen, and lined with horse-hair. Yet in this frail receptacle does the female cow-bird venture to deposit her egg; and to the management of these pigmy nurses, leaves the fate of her helpless young.

[1] *Muscicapa phebe*, Lath.

[2] *Muscicapa cærulea*, Wilson.

THE RED-EYED FLYCATCHER[1]

Is the most distinguishable of all the warblers of our forests; it has a loud, lively, and energetic song; which it continues sometimes for an hour without intermission, as it hunts among the thick foliage. Its notes are in short emphatical bars, of two, three, or four syllables. In Jamaica, where this bird winters, it is called whip-tom-kelly, from an imagined resemblance of its notes to these words.

This bird builds a neat, pensile nest, between two twigs of a young dog-wood, or other young sapling. It is hung by the two upper edges, and formed of pieces of hornets' nests, some flax, fragments of withered leaves, slips of pine bark, and bits of paper, all glued together by the saliva of the bird and the silk of caterpillars; lined with fibrous bark, grass, and hair. These nests are very durable, and selected by the cow-bird as one of the numerous receptacles for her egg; the red-eyed flycatcher showing as much solicitude for the young foundling as if it were her own. This bird is five inches and a half long; the plumage is yellow olive above; the under parts are white; the crown is ash, bordered with black. The iris of the eye is red.

The red-eyed flycatcher is common throughout the United States, and is an inhabitant of the city as well as the forest. On a fine summer's day, his lively notes may be heard among the branches of the elms on Boston common.

THE YELLOW-THROATED FLYCATCHER[2]

Is found chiefly in the woods, hunting among the high branches; and has an indolent and plaintive note, which it repeats with some little variation every ten or twelve seconds, like *preeo*, *preea*, &c. It is often heard in company with the preceding; the loud, energetic notes of the latter, mingling with the soft, languid warble of the former, producing an agreeable effect, particularly during the burning heat of noon, when almost every other songster but these two is silent. Its nest is built on a tree, and composed of strips of bark, of grape-vines, moss, lichens, &c., and lined with fibres. Winged insects are its principal food.

This bird is five inches and a half long; the head and back of a fine yellow olive; the throat and breast a fine lemon color; the under parts are silky white; wings almost black, crossed with two white bars.

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[1] *Muscicapa olivacea*, Lin.

[2] *Muscicapa sylvicola*, Wilson.

THE WHITE-EYED FLYCATCHER[1]

Is another of the cow-bird's adopted nurses; a lively, active, and sociable little bird, possessing a strong voice for its size, and a great variety of notes, and sings during the whole summer. It probably winters in Mexico and the West Indies. It builds a very neat little nest in the figure of an inverted cone; it is suspended by the upper edge of the two sides on the circular bend of a prickly vine that generally grows in low thickets. It is constructed of bits of rotten wood, fibres of weeds, and pieces of paper, commonly newspapers. From this circumstance it is sometimes called the *Politician*. It makes a great ado when any one comes near the nest; looking down and scolding with great vehemence. It is five inches and a quarter long; the upper parts are fine yellow olive; those below white, except the sides of the breast, which are yellow.

THE SWALLOW-TAILED FLYCATCHER[2]

Is a very rare and beautiful bird, a specimen of which was shot, on the Arkansas river, by the exploring party under Major Long. It is as audacious as the king-bird, attacking with unhesitating intrepidity, and turning the flight of the most powerful of the feathered tribe. Its notes consist of a chirping something like *tsch, tsch*, much resembling that of the prairie dog, by which it deceived the members of Long's party into a belief that they were approaching one of the villages of this animal.

To the above may be added the Arkansas, Say's, Bonaparte's, Selby's, and Traill's Flycatchers, all of which belong to the United States.

THE AMERICAN REDSTART[3]

Has been classed among the warblers, yet it has all the characteristics of the flycatchers, and is in fact one of the most expert of its tribe. It will pursue a party of flies from the tops of the tallest trees, in an almost perpendicular, but zigzag direction, to the ground, while the clicking of its bill is distinctly heard; and I doubt not but it often secures ten or twelve of these in three or four seconds. Its notes or twitter, though animated and sprightly, are not deserving the name of song; sometimes they are *wêese, wêese, wêese*, repeated every quarter of a minute, as it skips among the branches; at other times this twitter varies to several other chants, which we

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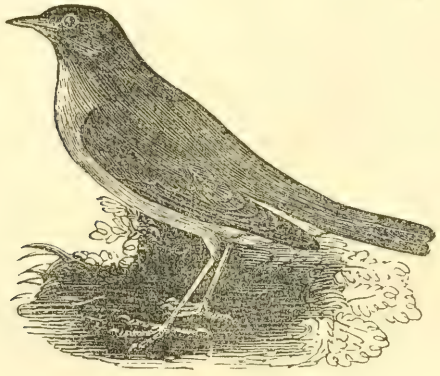
[1] *Muscicapa cantatrix*, Wilson. [2] *Muscicapa forficata*, Gmel.
[3] *Muscicapa ruticilla*, Lin.

can instantly distinguish in the woods. It is sure to be seen in the interio of forests, the borders of swamps, and meadows, and in deep glens covered with wood, and wherever flying insects abound. It is very generally found in the United States.

The name redstart has been given to it from its supposed resemblance to the redstart of Europe. It builds in low bushes; the nest is built of flax moistened with saliva, and lined with soft down. The male is extremely anxious for its preservation, and on any one's approaching the place, will flit about within a few feet, seeming greatly distressed.

This bird is five inches long; the general color above is black, glossed with blue; the sides of the breast, part of the wings and tail, of a fine orange, and the under parts white.

THE NIGHTINGALE[1]



Visits England in the beginning of April, and leaves it in September. It is found but in some of the southern parts of that country, being totally unknown in Scotland, Ireland, or North Wales. They frequent thick hedges and low coppices, and generally keep in the middle of the bush, so that they are rarely seen. It is not by the beauty of his plumage that this universally admired bird has become a general favorite, and the theme of almost every poet; for he is one of those warblers which are the most humbly attired. He is about six inches long, and the upper part of his body is of a rusty

[1] *Sylvia luscinia*, Lath. The genus *Sylvia* has the bill straight, slender, awl-shaped, the base deeper than broad; point of the upper mandible frequently notched, the under one straight; nostrils basal, lateral, ovoid, partly covered by a membrane; tarsus longer than the middle toe; the exterior toe joined at its base to the middle one; first quill feather very short, or none; second scarcely exceeding the third; great wing-coverts much shorter than the quill feathers.

brown, tinged with olive; the under parts are of a pale ash color, almost white at the throat and belly. But in his song he surpasses all the choristers of the air, his notes being exquisitely varied, soft, and harmonious, and rendered still more pleasing by their being poured forth in the night, when the other warblers are all silent. They begin their song in the evening, and generally continue for the whole night. For weeks together, if undisturbed, they sit upon the same tree; and Shakspeare rightly describes the nightingale, sitting nightly in the same place. In a calm evening, he may be heard to the distance of more than half a mile.

In the beginning of May, the nightingale prepares to make its nest, which is formed of the leaves of trees, straw, and moss. The nest, being very eagerly sought after, is as cunningly secreted; so that but very few of them are found by the boys when they go upon these pursuits. It is built at the bottom of hedges, where the bushes are thickest and best covered. While the female continues sitting, the male, at a good distance, but always within hearing, cheers the patient hour with his voice, and, by the short interruption of his song, often gives her warning of approaching danger. She lays four or five eggs; of which but a part, in England, come to maturity.

The delicacy, or rather the fame, of this bird's music, has induced many to abridge its liberty, to secure its harmony. Its song, however, in captivity, is not so very alluring; and the tyranny of taking it from these hedges, where only it is most pleasing, still more depreciates its imprisoned efforts. Gesner assures us, that it is not only the most agreeable songster in a cage, but that it is possessed of a most admirable faculty of talking.

THE BLACK-CAP.[1]

This bird is rather more than five inches in length, and is of the titmouse kind. The upper mandible is of a dark horn color, the under one light blue, and the edges of both whitish; the top of the head is black, from which circumstance it derives its name; the sides of the head and back of the neck are ash color; the back and wings of an olive gray; the throat and breast of a silvery gray; the belly white; the legs are of a bluish color, inclining to brown; the claws black. The head of the female is of a dull rust color

[1] *Sylvia atricapilla*, Lath.

The black-cap visits England about the middle of April, and retires in September; it is common in Italy, but in England it is rather a rare bird It frequents gardens, and its nest, which it builds near the ground, is composed of dried grass, moss, and wool, and lined with hair and feathers. The female lays five eggs, of a pale reddish brown, sprinkled with darker colored spots. During the time of incubation the male attends the female, and sits by turns; he likewise procures her food, such as flies, worms and insects. This bird sings sweetly, and so like the nightingale, that in Norfolk it is called the mock-nightingale. Black-caps feed chiefly on flies and insects, and not unfrequently on ivy, and other berries.

THE REDBREAST.[1]

Though the redbreast is generally admired for his song, he is still more admired for his attachment to, and confidence in, mankind. In all countries, he is a favorite, and has what may be called a pet name. The inhabitants of Bornholm call him *Tommi Liden*, the Norwegians, *Peter Ronsmed*, the Germans, *Thomas Gierdet*, and in England he is known as Robin Redbreast, or by the still more familiar appellation of Bob. Buffon describes, with his usual elegance, the winter manners of this bird. "In that season," says he, "they visit our dwellings, and seek the warmest and most sheltered situations; and if any one happens still to continue in the woods, it becomes the companion of the faggot maker, cherishes itself at his fire, pecks at his bread, and flutters the whole day round him, chirping its slender *pip*. But when the cold grows more severe, and thick snow covers the ground, it approaches our houses, and taps at the windows with its bill, as if to entreat an asylum, which is cheerfully granted; and it repays the favor by the most amiable familiarity, gathering the crumbs from the table, distinguishing affectionately the people of the house, and assuming a warble, not indeed so rich as that in the spring, but more delicate. This it retains through all the rigors of the season, to hail each day the kindness of its host, and the sweetness of its retreat." The bill of the robin is slender and delicate; its eyes are large, dark, and expressive, and its aspect mild; its head and all the upper parts of its body are brown, tinged with a greenish olive; the neck and breast are of a fine deep reddish orange; a spot of the same color marks its forehead; its belly is whitish, and the legs and feet of a dusky black. It is near six inches in length, from the tip of the bill to the end of the tail; the former being about half an inch, and the latter two inches and a half.

This bird, in England, has the sweetest song of all the feathered tribe: the notes of other birds are, indeed, louder, and their inflections more capricious, but the redbreast's voice is soft, tender, and well supported; and the more to be valued, as we enjoy it the greatest part of the winter.

[1] *Sylvia rubecola* Lath.

During the spring, the robin haunts the wood, the grove, and the garden-and retires to the thickest and shadiest hedge-rows to breed in, where its nest is usually placed among the roots of trees, in some concealed spot near the ground. In winter it endeavors to support itself, by chirping round the warm habitations of mankind, and by coming into those shelters where the rigor of the season is artificially expelled, and where insects are found in the greatest numbers, attracted by the same cause. The female lays from five to seven eggs, of a dull white color, diversified with reddish streaks. Insects and worms are the principal food of the redbreast. The latter it very dexterously renders fit to be eaten, by taking hold of the extremity of one in its beak, and beating it against the ground till the inside comes away, and then repeating the operation with the other end, till the outer part is entirely cleansed.

THE REDSTART.[1]

This bird measures rather more than five inches in length. Its bill and eyes are black; its forehead is white; the cheeks, throat, fore part, and sides of the neck, are black, which color extends over each eye; the crown of the head, hinder part of the neck, and the back, are of a deep blue gray; in some subjects, probably old ones, this gray is almost black; its breast, rump, and sides are of a fine glowing red, inclining to orange color, which extends to all the feathers of the tail, excepting the two middle ones, which are brown; the belly is white; the feet and claws are black. The female differs considerably from the male; her colors are not so vivid; the top of her head and back are of a gray ash color, and the chin is white.

The redstart is migratory; it appears about the middle of April, and departs in the latter end of September, or beginning of October; to what country it retires is not known; it frequents old walls and ruinous edifices, where it makes its nest, composed chiefly of moss, lined with hair and feathers. It is distinguished by a peculiar quick shake of its tail from side to side, on its alighting on a wall or other place. Though a wild and timorous bird, it is frequently found in the midst of cities, always choosing the

[1] *Sylvia phœnicurus*, Lath.

most difficult and inaccessible places for its residence; it likewise builds in forests, in holes of trees, or in high and dangerous precipices. The female lays four or five eggs, not much unlike those of the hedge-sparrow, but somewhat longer. Should she discover that they have been touched, she immediately forsakes them. These birds feed on flies, spiders, the eggs of ants, small berries, soft fruits, and such like. If taken when old, it is impossible to tame the redstart, but if caught young, and kept warm during the winter, it may be domesticated, and will pour forth its song, by night as well as by day, with great sweetness and freedom.

THE BLUE-BIRD.[1]

The blue-bird is one of the first messengers of spring, and meets with a hearty welcome from every body. He appears as early as February, and is seen with his mate reconnoitering the leaf in the garden, and the hole in the apple tree, the cradles of some generations of his ancestors. They then begin to clear out the old nest, and to prepare for the reception of their future offspring. Soon after this, another sociable little pilgrim arrives from the south, and finding such a snug birth pre-occupied, shows his spite, by watching a convenient opportunity, and, in the absence of the owner, pops in and pulls out the sticks; but takes especial care to make off as fast as possible.

Their principal food is insects and beetles, and sometimes spiders. In the fall they feed on berries, fruits, and seeds. The usual spring and summer song of this bird, is a soft, agreeable and oft-repeated warble, uttered with open quivering wings, and is extremely pleasing. In his motions and character he resembles the redbreast of Britain, and like him he is known to almost every child. He is of a mild and peaceful disposition, seldom quarrelling with other birds. His society is courted in the country, and few farmers neglect to provide for him, in some suitable place, a snug little summer-house, ready fitted and rent free. For this he more than sufficiently repays them by the cheerfulness of his song and the multitude of injurious insects which he destroys. Towards fall, his song changes to a single plaintive note, as he passes over the yellow and many-colored woods; and its melancholy air recalls to our minds the approaching decay of the face of nature. Even after the trees are stripped of their leaves, he still lingers over his native fields, as if loth to leave them. Indeed he appears scarcely ever totally to forsake us, as with every return of mild and open weather, we hear his plaintive note amidst the fields, or in the air, seeming to deplore the devastation of winter.

The blue-bird is six inches and three quarters long; the wings are remar-

[1] *Sylvia sialis*, Wilson.

kably full and broad, and dusky black at the tips; the whole upper parts are rich sky-blue, with purple reflections; under parts chesnut color and white.

THE BLUE-WINGED YELLOW WARBLER[1]

Visits us from the south; haunts thickets and shrubberies, searching the branches for insects; is fond of visiting gardens, orchards, and willow trees, of gleaning among blossoms and currant bushes; and is frequently found in very sequestered woods, where it generally builds its nest. It is in the form of an inverted cone, the bottom thickly bedded with dry beach leaves; the sides formed of the dry bark of weeds, and lined with grass. This species is five inches and a half long; back is rich green olive; crown and front orange yellow; whole lower parts yellow.

THE BLUE-EYED YELLOW WARBLER[2]

Is a very common bird, and appears almost always actively employed among the leaves and blossoms of the willows, snowballs and poplars, searching after small green caterpillars, which are its principal food. It has a few shrill emphatic notes, not deserving the name of song. It is a very sprightly, unsuspicious, and familiar bird; is often seen in and about gardens, among the blossoms and fruit trees; and, on account of its color, is very noticeable. Its nest is built with great neatness in the fork of a small shrub. It is composed of flax or tow, strongly twisted round the twigs, and lined with hair and the down of fern. This interesting little bird will feign lameness to draw you from its nest, fluttering feebly along, and looking back to see if you follow him. It is five inches long. The upper parts are greenish yellow; crown, front, and whole lower parts, rich golden yellow; breast and sides streaked with dark red.

THE GOLDEN-WINGED WARBLER[3]

Is another spring passenger through the United States. Its habits partake very much of those of the titmouse, and in their language and actions very much resemble them. It darts actively among the young leaves and opening buds, and is rather a scarce species. It is five inches long; the crown is golden yellow; the wings yellow; the rest of the upper parts ash or slate color.

[1] *Sylvia solitaria*, Wilson. [2] *Sylvia cæstiva*, Lath.
[3] *Sylvia chrysoptera*, Lath.

THE GOLDEN CRESTED WREN.[1]

This is the smallest of all British birds, is very beautiful, and has an extremely delicate and pleasing note, somewhat less loud than that of the common wren. In winter it may be distinguished by its shrill squeak, which somewhat resembles the cricking of a grasshopper. It is very agile, and is almost constantly in motion, either fluttering from branch to branch, creeping on all sides of the trees, clinging to them in all ways, and often hanging with its back downward, like a titmouse. Insects and their eggs, small worms, and various kinds of seeds, constitute its food. The female lays from ten to eighteen eggs, which are scarcely larger than peas; and the nest is frequently formed amongst the leaves at the top of the branch of a fir tree, where, in high winds, it swings like a pendulum.

Of this wren the head and upper part are of a deep reddish brown; the back, and the coverts of the wings and tail, are marked with slender transverse black lines; the quill feathers are barred with black and red; the belly and sides are crossed with narrow, dusky and pale reddish brown lines; the tail is crossed with dusky bars; the throat is a yellowish white; and there is a stroke of white above each eye.

THE EUROPEAN WREN.[2]

This lilliputian songster is a native of every part of Europe. It weighs only three drachms, is but four inches in length, from the point of the bill to the end of the tail, and is admired for the loudness of its note, compared with the little body whence it issues. It will carol forth its strains unconcerned during a fall of snow. Even when confined in a cage, it has sometimes been known to sing as strong as when in its native fields, and with equal freedom and mellowness of song. It commonly creeps about hedges or trees, in the vicinity of farmyards, and sings very late in the evening, though not, like the nightingale, after the landscape is enveloped with darkness.—The female lays from ten to eighteen eggs, which are very small, white, and sprinkled with red spots.

The wren constructs its nest in a very curious manner. Unlike other birds, it does not begin first at the bottom. If the nest be placed against a bank, it commences the fabric at the top; if against a tree, it at the outset

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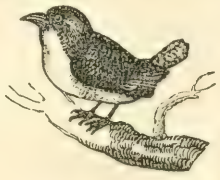
[1] *Regulus auricapillus*, Selby. The genus *Regulus* has the bill straight, slender, deeper than broad, compressed, the edges bending inwards; nostrils basal, with bristles directed forwards; wings with the first quill short, the second shorter than the third, which is the longest; tarsus longer than the middle toe.

[2] *Troglodytes Europæus*, Cuv. The genus *Troglodytes* has the bill slender, and slightly compressed, curved, emarginated; nostrils basal, half covered by a naked membrane; wings short and rounded; fourth and fifth feathers of equal length and longest; tail short, rounded, erect; tarsus the length of the middle toe.

traces the outline on the bark, and closes the sides and top in succession. When it builds against a hayrick, the exterior of the nest is of that material; when it is on the side of a tree covered with white lichen, or green moss, the fabric is of one or other of those substances; but the interior is uniformly lined with feathers.

THE AMERICAN HOUSE WREN.[1]



The house wren is a well known and familiar bird, who builds his nest, sometimes under the eaves, or in a hollow cherry tree; but most commonly in small boxes fixed on a pole, for its accommodation. He will even put up with an old hat, and if even this is denied him, he will find some hole or crevice, about the house or barn, rather than abandon the dwellings of man. A mower once hung up his coat, under a shed near a barn; two or three days elapsed before he had occasion to put it on; thrusting his arm up the sleeve he found it completely filled with some rubbish as he expressed it, and on extracting the whole mass, found it to be the nest of a wren, completely finished and lined with a large quantity of feathers. In his retreat he was followed by the forlorn little proprietors, who scolded him with great vehemence, for thus ruining the whole economy of their domestic affairs.

The immense number of insects which this sociable little bird removes from the garden and fruit trees ought to endear him to every cultivator; and his notes, loud, sprightly, and tremulous, are extremely agreeable. Its food is insects and caterpillars, and while supplying the wants of its young, it destroys, on an average, many hundreds a day. It is a bold and insolent bird against those that venture to build within its jurisdiction; attacking them without hesitation, though twice its size, and compelling them to decamp. I have known him to drive a pair of swallows from their newly formed nest, and take immediate possession of the premises. Even the blue-bird, when attacked by this little impertinent, soon relinquishes the contest; with those of his own species, also, he has frequent squabbles.

The house wren inhabits the whole of the United States. It is four inches and a half long; the whole upper parts are a deep brown; the throat, breast, and cheeks, clay color; the under parts mottled.

[1] *Troglodytes fulvus*, Bonap.

THE MARSH WREN[1]

is very numerous along the tide-water of the rivers in Pennsylvania, where they frequent the reeds and splatter docks, to search for flying insects, and green grasshoppers, which are its principal food. To such places it limits its excursions As to its notes, it would be mere burlesque to call them song. It builds a durable and warm nest of rushes and mud, which it suspends among the reeds. Its size, color, and habit of erecting its tail, give it something the appearance of the house wren. It is five inches long, and of a dark brown color.

THE GREAT CAROLINA WREN[2]

Would at first sight be called a *wren*, but this and the preceding are decidedly *creepers*. It is found only in the southern states, where it is attached to cypress swamps, deep hollows, among decaying timber, and coves near rivers and creeks. It has all the jerking manner of the wren, skipping about with great nimbleness, hopping into caves, and disappearing into holes and crevices like a rat, for several minutes, and then reappearing in another quarter. It occasionally utters a loud, strong, and singular twitter, resembling the word *chirrup*, dwelling long and strongly on the first syllable. It has also another chant, rather more musical, like "*Sweet William, Sweet William*," much softer than the former. Its food seems to consist of those insects and their larvæ that frequent low damp caves, piles of dead timber, old roots, projecting banks of creeks, &c. It is five inches and a quarter long, and of a reddish brown color.

THE WHEAT-EAR.[3]

This bird weighs upwards of an ounce, and has a slender black bill, about half an inch long; the tongue is cloven or slit, and the inside of the mouth black; the eyes are of a hazel color, above which there is a white line passing towards the hinder part of the head; and below them, a large black one, which extends itself from the corners of the mouth to the ears. The head and back appear of a cinereous color, with a mixture of red. The rump is

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[1] *Troglodytes palustris*, Bonap. [2] *Troglodytes ludovicianus*, Bonap.

[3] *Saxicola œnanthe*, Bechst. The genus *Saxicola* has the bill straight, slender, slightly carinated, and advancing upon the forehead; the top of the under mandible a little bent and emarginated; nostrils basal, lateral, ovoid, partly concealed by a membrane; tarsus considerably longer than the middle toe; the outer toe joined at its base to the middle one; third and fourth quill feathers the longest.

generally white, from whence, by some, it has the name of white-tail; the belly is white, tinged with yellow, dashed faintly with red; the breast and throat are more deep; the coverts and quills are black, with their extreme

edges white, tinctured with a dusky red: the tail is something more than two inches long, and the upper half of it is black, the lower, white. The female wants the black mark across the eyes; the bar of white across the tail is narrower than that of the male; and the general colors are more dull.

The wheat-ear visits England annually in the middle of March, and leaves in September. The females come first, about a fortnight before the males; and they continue to come till the middle of May. In some parts of England they are found in vast plenty, and are much esteemed. About Eastbourne, in Sussex, they are taken in snares made of horse-hair, placed beneath a long turf. As they are very timid birds, the motion even of a cloud, or the appearance of a hawk, will immediately drive them into the traps. These traps are first set every year on St. James's day, (July 25;) soon after which, they are caught in astonishing numbers, considering that they are not gregarious, and that more than two or three are scarcely ever seen flying together. The numbers annually ensnared in the district of Eastbourne alone is said to amount to nearly two thousand dozen. One shepherd has caught eighty-four dozen of them in a day. The birds caught are chiefly young ones, and they are invariably found in the greatest number when an easterly wind prevails; as they always come against the wind.

It is supposed, that the immense swarms of these birds which are found on the downs about Eastbourne, are occasioned by a species of fly, their favorite food, that feeds on the wild thyme, and abounds in the adjacent hills. In England they are held in as much estimation as the ortolan is on the continent. A few of these birds breed in the old rabbit-burrows there. The nest is large, and made of dry grass, rabbit's down, a few feathers, and horse-hair. The eggs are from six to eight, and are of a light color.

THE WHITE WAGTAIL.[1]

This is an elegant, slender-bodied bird, and, next to the robin and the sparrow, is the most familiar with man. It weighs about six drachms, and is about seven inches and a half from the tip of the bill to the end of the tail, and about eleven between the point of each wing, when extended. It has a slender, straight, sharp bill, of a black or dusky color, upwards of an inch long; the circles of the eyes are brown, or hazle colored, with a large white spot encircling each eye, and another or two underneath it, on each side of the throat; the top of the head, and the fore part of the neck, or throat, and the upper part of the back, are all black. Some of the tips of the quill feathers are white, which form a small white line upon the wing, and another is also formed by the white edges of some of the rows of the covert feathers; the lower parts of the breast and belly are both white. The tail is about three inches long, and is almost continually in motion, wagging up and down, from whence it is supposed to derive the name of wagtail; the outer feathers are chiefly white, the rest black. This motion is supposed to be intended to make the tail act as a kind of lever or counterpoise, to balance the body on the legs. The claws are sharp pointed, and pretty long, of a dusky or blackish color.

These birds are frequently seen about the brinks of rivers, ponds, and small pools of water, and also amongst the low grass in dewy mornings, where they feed upon flies, worms, beetles, and other small insects. They particularly haunt streams where women come to wash their linen, the insects being attracted thither by the froth of the soap. From this circumstance the French call them *lavandières*. They build under the eaves of houses, and in holes in the walls of old buildings; laying four or five eggs.

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[1] *Motacilla alba*, Lin. The genus *Motacilla* has the bill slender, straight, subulate, angular between the nostrils; edges of the lower mandible compressed; nostrils basal, lateral, oval, partly concealed by a naked membrane; tarsus considerably longer than the middle toe; exterior toe joined to the middle one at the base; hind claws strong and sometimes long; tail very long, equal, horizontal; one of the larger coverts as long as the wing feathers.

ORDER IV.—GRANIVOROUS BIRDS.

Birds of this order have the bill more or less conical, short, and strong; ridge more or less flattened, advancing upon the forehead; mandibles generally without notches; three toes before and one behind, the anterior ones entirely divided; wings of medium length.

THE SKYLARK[1]

Is one of the most esteemed of the European song birds. It is found throughout the whole of Europe, many parts of Asia, and the north of Africa. Its song is begun early in the spring, and continued during the greater part of summer. It rises perpendicularly in a spiral flight, singing as it rises, till it frequently soars beyond the reach of vision. On the approach of winter, the larks begin to collect in immense flocks, quitting the more elevated parts of the country, and resorting to the coasts; at this period they are fat, and vast numbers are taken for the table. The lark is six inches in length; its color is reddish, with the under parts yellowish white.

The lark builds its nest upon the ground, beneath some turf, that serves to hide and shelter it. The female lays four or five eggs, of a dusky hue, in color somewhat like those of a plover. It is while she is sitting, that the male usually entertains her with his singing; and while he is risen to an imperceptible height, yet he still has his loved partner in his eye, nor once loses sight of the nest, either while he ascends or is descending. This

[1] *Alauda arvensis*, Lin. The genus *Alauda* has the bill subconic, short, with the mandibles of equal length, and the upper one slightly convex; nostrils basal, lateral, partly concealed by reflected feathers; claw of the hind toe much produced, and nearly straight; wings with the first quill short or wanting, the third the longest; coronal feathers generally produced.

harmony continues several months, beginning early in the spring, on pairing. In winter they assemble in flocks, when their song forsakes them, and the bird-catchers destroy them in great numbers, for the tables of the luxurious.

The common food of the young larks is worms and insects; but after they are grown up they live chiefly on seeds, herbage, and most other vegetable substances

There are many other larks found in Europe, the most noted of which, next to the skylark, is the woodlark, which surpasses the skylark in richness, though not in variety of song.

THE BEARDED TITMOUSE[1]

Is about six inches long, and distinguished by a tuft of black feathers under each eye, resembling a mustachio. It is common in the marshes near London, and has erroneously been classed among the butcher-birds. The titmouse, which is also called the tomtit, bluecap, and nun, is about four inches and a half in length, and has a straight black bill, about half an inch long, pretty thick. The crown of the head is of a fine blue color; from the bill to the eyes there is a black line; and the forehead and cheeks are white. The latter color descends as low as the shoulders and middle part of the back, where it appears more shaded with a glossy green; the rump is of a fine blue. The quill feathers have some of their tips white, some blue, others green; the covert feathers by their white tips make a small transverse white line upon each wing. The breast, belly, and thighs are yellow, with a broad black line passing from the throat down the middle of the breast to the vent. The tail is about two inches and a half long, of a black color, except the outward edges of some of the feathers, which are blue. The legs and feet are a sort of lead color.

These birds feed on insects, seeds, and fruit. They often excite alarm in the owners of gardens, under the idea that they are destroying the buds, while, in fact, they are engaged in the beneficial operation of seeking for the caterpillars that infest them. They are very prolific, laying from fourteen to twenty eggs at a time. If the eggs be touched, the female forsakes her nest, and builds again. Titmice will venture to assault birds that are twice or thrice their own bulk, and in this case they direct their aim chiefly at the eyes. They often seize upon birds that are weaker than themselves; which they kill, and having picked a hole in their skull, eat out their brains.

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[1] *Parus biarmicus*, Lin. The genus *Parus* has the bill short, straight, strong, conical, compressed terminating in a point, base with small hairs; nostrils basal, rounded, concealed by projecting feathers; legs stout; toes divided to their origin, nail of the hind one strongest and most bent; wing feathers the first of medium length, or almost deficient, the fourth and fifth the longest.

They are very fond of flesh, vast admirers of suet, and frequently pick bones from dunghills and other places. This bird is distinguished above the rest of its kind, by its rancor against the owl.

There are many European varieties of this bird; the greater titmouse is about five inches in length. The nests of almost every kind are constructed with the most exquisite art, and with materials of the utmost delicacy; such as moss, hair, and the web of spiders, with which the whole is strongly tied together.

BLACK-CAPT TITMOUSE.[1]

This is one of our American birds, active, noisy, and restless, hardy beyond any of his size, braving the severest cold of our continent, as far north as the country around Hudson's Bay, and always appearing most lively in the coldest weather. The males have a variety of very sprightly notes, which cannot indeed be called a song, but rather a lively, frequently repeated, and often varied, twitter. They are most usually seen during the fall and winter, when they approach nearer to the scenes of cultivation. They begin to build in April, choosing the deserted hole of a squirrel or woodpecker, and sometimes, with incredible labor, digging one out for themselves. They traverse the woods from tree to tree, tumbling, chatting, and hanging from the extremities of the branches, examining about the roots of the leaves, buds, and crevices of the bark, for insects and their larvæ. They also visit the orchards, the sides of the barn, and barn-yard, in the same pursuit.

These birds sometimes fight violently with each other, and are known to attack young and sickly birds that are incapable of resistance, always directing their blows against the skull.

The crested titmouse is also an inhabitant of the United States, but is more common in the northern parts.

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[1] *Parus bicolor*, Lin.

THE EUROPEAN YELLOW-HAMMER.[1]

It is larger than the sparrow. A greenish yellow, spotted with brown, is the hue of its head; the throat and belly are yellow; the breast and sides, under the wings, are mingled with red; and the tail is of a flesh color. It builds on the ground, feeds on insects and seeds; and has a soft note, not unlike that of the linnet.

THE ORTOLAN[2]

Is somewhat less than the yellow-hammer. The plumage on the upper parts is brownish chesnut, mixed with black; the under parts are pale rufous. These birds are common in France and Italy, but are not found in England They are caught in numbers to fatten for the table. This is done by including them in a dark room, and feeding them with oats and millet. By this process they become so fat that they would die from that cause alone, were they not killed for sale. In this state they will sometimes weigh three ounces, and are accounted the most luxurious repast of the epicure, being, as it were, one lump of exquisite fat.

THE BOB-O-LINK, OR RICE BUNTING,[3]

Called also *reed bird* in some of the southern states, and *butter bird* in Jamaica. He is seven and a half inches long. This is one of the most common birds in the United States, and is familiar to every schoolboy from the lively jingle of his note. The plumage of the male is an odd mixture of white and black in the spring and early part of the summer—he changes to a yellowish brown late in the season. The female is of a dusky brown. In the eastern states the arrival of this bird is welcomed with pleasure, as he is highly esteemed and his habits are comparatively harmless to the crops. In the southern states he is more annoying to the husbandman and the sportsmen of those parts, who show the rice birds no mercy, as his flesh is excellent. They do great damage to the early wheat and barley in Virginia, and eagerly devour young ears of Indian corn. They feed also on grubs,

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[1] *Emberiza citrinella*, Lin. The genus *Emberiza*, or Bunting, has the bill short, conical, compressed, sharp edged: the upper mandible narrower than the under, the edges of both bent inwards; nostrils, basal, rounded, surmounted and partly covered by the feathers of the forehead; toes divided, the posterior with a short and bent claw; tail forked or slightly rounded.

[2] *Emberiza hortulana*, Lin.

[3] *Emberiza oryzivora*, Wilson.

flies, and caterpillars. They pour down upon the oat fields in a torrent, and resort to the shores of the Delaware and Schuylkill in immense numbers, to feed upon the reeds or wild oats. At this time they are extremely fat. Their note is a single *chink*, and is heard overhead with little intercession from morning to night. These are *halcyon* days for our gunners, and many a

lame and rusty gun-barrel is put in requisition for the sport. The report of musketry along the reedy shores of the river is almost incessant, resembling a running fire. The markets of Philadelphia at this season exhibit proofs of the prodigious havoc made among the birds. In the fall, they swarm in the rice fields, and devour great quantities of that grain.

THE COW-BUNTING.[1]

The cow-bunting has a most remarkable character, which is the unaccountable practice it has of dropping its eggs into the nests of other birds, instead of building and hatching for itself; and thus entirely abandons its family to the care and mercy of strangers. I have often found the young cow-bunting in the nests of small birds; and have seen these last followed by the young foundling, calling out clamorously for food; and I once took a very fine one from the nest of the Maryland yellow throat, where it was fostered with great care.

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[1] *Emberiza pecoris*, Wilson.

The migrations of these birds extend very far north. On their way they frequently stop in June, and are observed loitering singly, among thickets, reconnoitering no doubt for proper nurses, to whose care they may commit the hatching of their eggs, and the rearing of their helpless orphans. Among the birds selected for this duty are the red-eyed and white-eyed fly catchers, the chipping sparrow, the golden-crowned thrush, the blue-bird, the small blue gray flycatcher and and the yellow throat. The yellow throat and the red-eyed flycatcher, appear to be particular favorites; and the kindness and affectionate attention which those two little birds pay to their nurslings, fully justifies the partiality of the parents. What reason nature may have for this extraordinary deviation from her general practice, is beyond my comprehension.

These birds often frequent corn and rice-fields; but are more commonly found accompanying the cattle, feeding on the seeds and worms, &c., which they pick up amongst the fodder, &c. Hence they are called cow-birds, cowpen birds, and crow black-birds. They are generally found associated with the red-winged black-birds, which they in many respects resemble.

In the month of July, says Wilson, I took from the nest of a Maryland yellow throat, a young male cow-bunting, which filled and occupied the whole nest. I took the bird home with me, and placed it in the same cage with a red-bird, who at first and for several minutes after examined it closely and seemingly with great curiosity. It soon became clamorous for food, and from that moment the red-bird seemed to adopt it as his own, feeding it with all the assiduity and tenderness of the most affectionate nurse. When he found that the grasshopper he had brought it, was too large for it to swallow, he took the insect, broke it into small pieces, chewed them a little to soften them, and then with all the delicacy and gentleness imaginable, put them separately in his mouth. He often spent several minutes looking at and examining it all over, and in picking off any particles of dirt that he found on its plumage. In six months the cow-bird was in complete plumage, and repaid the affectionate services of his foster-parent, with a frequent display of his musical talents; these it must be confessed are far from ravishing, yet for their singularity are worthy of notice. He spreads his wings, swells his body into a globular form, bristling every feather in the manner of a turkey-cock, and with great seeming difficulty utters a few low sputtering notes; always on these occasions strutting in front of the spectator with great consequential affectation. To see the red-bird, who is himself so excellent a performer, silently listening to all this guttural sputter, reminds one of the great Handel, contemplating a wretched violin scraper!

The cow-bunting is seven inches long; the head and neck is a silky drab; the upper part of the breast a deep changeable violet; the rest of the bird is black, glossed with green.

THE PAINTED BUNTING

Is found in Lower Louisiana, where it is universally known among the French inhabitants, and called by them "*Le Rapei*," and by the Americans the *Nonpareil*. Its gay dress and docility of manners have procured it many admirers; for these qualities are highly attractive, and always carry their own recommendation along with them. The low countries of the southern states, in the vicinity of the sea and along the borders of our large rivers, particularly among the rice plantations, are the favorite haunts of this elegant little bird. A few are seen in North Carolina; they are more numerous in South Carolina, and still more so in Georgia. Their notes very much resemble those of the indigo bird, but want their strength and energy.

These birds are domesticated at New Orleans, and is the most common cage bird they have. Six of these birds, says Wilson, which I brought with me from New Orleans by sea, soon became reconciled to the cage. In good weather, the males sung with great sprightliness. They were greedily fond of flies, which accompanied us in great numbers during the whole voyage; and many of the passengers amused themselves with catching them, and giving them to the nonpareils; till at length, the birds became so well acquainted with the amusement, that as soon as they saw any of the people attempting to catch flies, they assembled at the front of the cage, stretching out their heads evidently much interested in the issue of their success.

They build their nests in orange trees, and sometimes in blackberry bushes. They are formed of dry grass, and the silk of caterpillars, and lined with hair and fine roots. The plumage undergoes great changes, not being perfect till the fourth season. The head and neck of the male is of a rich purplish hue, the chin and lower parts are vermilion; back glossy yellow, stained with green and sometimes with red; wings red, edged with green. It is seven inches and three fourths long. The female is of a green olive; the lower parts are light yellow. It is five inches and a half long.

The food of the painted bunting consists of rice, insects, and various kinds of seeds, among which are the seeds of ripe figs. They frequent gardens, and chant occasionally during the whole summer. In the fall they retire to the south.

THE TOWHEE-BUNTING, OR GROUND ROBIN.

This bird is also called *chewink* and *swamp robin*. It generally keeps close to the ground, and frequents thickets and sheltered spots, scratching among

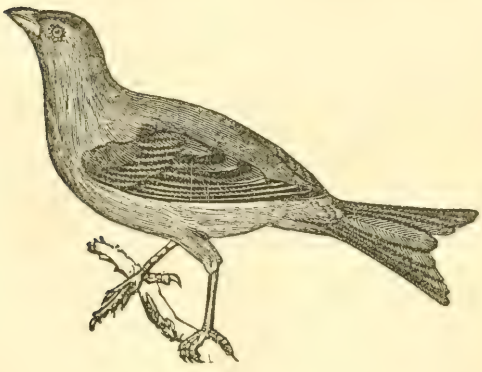
[1] *Emberiza erythrophthalma*, Wilson.

the leaves for worms and larvæ. It is quite a familiar bird, and will suffer a person to walk round the bush or thicket, where it is at work, without betraying any signs of alarm, and when disturbed, uttering the notes *tow-he*, repeatedly. At times, the male mounts a small tree, and chants his few simple notes for an hour at a time. They are loud, but not unmusical. He is fond of thickets near streams of water, and is found generally over the United States. The nest is placed on the ground among the dry leaves, and is large and substantial. He shows great affection for his young, and is remarkable for the cunning with which he conceals his nest, sometimes nearly covering it with dry grass. In Virginia he is called the bulfinch.

This bird is eight inches and a half long; of a black color above, and white below. The eye changes in color; the iris being sometimes white, and often red.

There are various others of the bunting genus, natives of the United States, as the white-crowned bunting, the bay-winged bunting, the black-throated bunting, Henslow's bunting.

THE SCARLET TANAGER[1]



Is one of the most beautiful of American birds, having a plumage of the richest scarlet, with wings of jet black. He is spread over the United States, and is found even in Canada, and South America. He rarely approaches

[1] *Tanagra rubra*, Lin. The genus *Tanagra* has the bill short, strong, triangular at the base, carinated, much compressed at the point, which is bent; upper mandible longer than the under, and notched; edges of the mandibles bent inwards; under mandible straight, and somewhat gibbous toward the middle; nostrils basal, lateral, rounded, partly concealed by projecting feathers; tarsus the length of the middle toe; the external toe joined at its base; the internal free; wings with the second and third quills longest.

the habitations of man, unless perhaps to the orchard, where he sometimes builds; or to the cherry trees in search of fruit. The depths of the woods are his favorite abode. There, among the thick foliage of the tallest trees, his simple, and almost monotonous notes of *chip, churr*, repeated at intervals in a pensive tone, may be occasionally heard, which appear to proceed from a considerable distance, though the bird be immediately above you; a faculty bestowed upon him by the beneficent Author of nature, no doubt for his protection, to compensate in a degree for the danger to which his glowing color would often expose him. Besides this usual note, he has, at times, a more musical chant. His food consists of large winged insects, such as wasps, hornets, and humble bees, and also of fruit. His nest is built on the horizontal branch of a tree, sometimes an apple tree, and is but slightly put together; stalks of broken flax, and dry grass, so thinly woven together, that the light is easily perceivable through it, from the repository of his young. His manners are modest, easy, and inoffensive. He commits no depredations on the property of the husbandman; but rather benefits him by the daily destruction of many noxious insects; and when winter approaches, he is no plundering dependant, but seeks in a distant country that sustenance which the severity of the season denies to his industry in this. He is a striking ornament to our rural scenery, and none of the meanest of our rural songsters. Such being the true traits of his character, we shall always with pleasure welcome this beautiful stranger to our orchards, groves, and forests.

When you approach the nest, the male keeps cautiously at a distance, as if fearful of being seen; while the female hovers round in the greatest agitation and distress. When the young leave the nest, the male parent takes a most active part in feeding and attending them, and is then altogether indifferent of concealment.

THE SUMMER RED-BIRD.[1]

The changes of color which this bird is subject to, during the first year, have deceived European naturalists so much, that four different species of tanager have been formed out of this one. The female differs much in color from the male. The food of this bird consists of various kinds of bugs, and large black beetles. During the season of whortleberries they seem to live almost entirely upon them. In Pennsylvania they are rare, but in New Jersey they may be generally found. The note of the male is a strong and one-toned whistle, resembling a loose trill or shake on the notes of a fife,

[1] *Tanagra æstiva*, Wilson.

frequently repeated; that of the female is rather a kind of chattering, approaching nearly to the rapid pronunciation of *chicky-tucky-tuck*, when she sees any person approaching the neighborhood of her nest. She is, however, rarely seen, and usually mute, and scarcely to be distinguished from the color of the foliage at a distance; while the loquacity and brilliant red of the male make him very conspicuous; and when seen among the green leaves, he has a most beautiful and elegant appearance.

The summer red-bird delights in a flat sandy country covered with wood, and interspersed with pine trees, and is more numerous on the shores of the Atlantic than in the interior. In both the Carolinas, Georgia, and Florida they are numerous; in the northern states they are very rare.

THE AMERICAN CROSSBILL.[1]

This species is a regular inhabitant of almost all our pine forests situated north of forty degrees, from September to April. The Great Pine Swamp in Pennsylvania appears to be their favorite rendezvous. They then appear in large flocks, feeding on the seeds of the hemlock and white pine; have a loud, sharp, and not unmusical note; chatter as they fly; alight during the prevalence of the deep snows before the door of the hunter, and around the house, picking off the clay with which the logs are plastered, and searching in corners where any substance of a saline nature had been thrown. At such times they are so tame, as only to settle on the roof of the cabin when disturbed, and a moment after, descend to feed as before. They are then easily caught in traps. When kept in a cage they have many of the habits of the parrot, often climbing along the wires, and using their feet to grasp the cones in, while taking out the seeds.

This bird has hitherto been considered a mere variety of the European species, but it differs in several respects. I have therefore separated it from the grosbeaks. It is subject to many changes of color. The male is five inches and three fourths long. The general color of the plumage, when perfect, is a red-lead color; the tail is forked and edged with yellow. The female is less than the male; the plumage is of an olive yellow.

[1] *Loxia curvirostra*, Lin. The genus *Loxia* has the bill rather long, strong, much compressed, the two mandibles equally convex, and crossing each other at the points when at rest; nostrils round, basal, and lateral, concealed by reflected bristly feathers; the anterior toes entirely divided; wings with the first quill feathers longest; tail forked.

THE CARDINAL GROSBEAK.[1]

The cardinal grosbeak is one of our most common cage birds, and is very generally known both in America and Europe. Numbers of these have been carried over to France and England, in which last country they are called Virginia nightingales. They have great clearness and variety of tones; many of them resemble the clear notes of a fife, and are nearly as loud. They begin in the spring at the first appearance of dawn, and repeat a favorite stanza or passage, twenty or thirty times. His sprightly figure and gaudy plumage, his vivacity, strength of voice, and the little expense with which he is kept, will always make him a favorite.

This species inhabits America from New England to Carthagena. In the southern states they are the most numerous. They love to reside in the vicinity of fields of corn, a grain that constitutes their chief and favorite food. The seeds of apples, cherries, and many other sorts of fruit, are eaten by them; and they are accused of destroying bees. They build their nests in a holly, cedar, or laurel bush. It is constructed of twigs and weeds. They are hardy birds, easily kept, sing six or eight months in a year, and are most lively in wet weather. They are known by the names of red-bird, Virginia red-bird, Virginia nightingale, and crested red-bird.

[1] *Loxia cardinalis*, Lin.

The others of this genus in the United States are the pine grosbeak, the blue grosbeak, the rose-breasted grosbeak, the evening grosbeak, and the spotted grosbeak.

THE BULFINCH[1]

Is one of the most common of European birds. When at its full growth it measures, from the point of the bill to the end of the tail, six inches, of which the tail is two. It has a short black bill, very strong and crooked, the upper part hanging over the under side, like that of a hawk; the tongue is short, and the eyes of a hazel color; the head and neck in proportion to the body are larger than in the generality of small birds, from which, most probably, they derived their name. In some places they are called ropes; in others, thick-bills, and in some red-hoops, or tony-hoops, probably from their wild hooping kind of note.

The bulfinch makes its nest of an ordinary mean fabric, in bushes, in which the female lays four or five eggs of a bluish color, with dark brown and reddish spots. The nest so closely resembles the surrounding foliage in color, that it is not easily to be discovered. In the summer it mostly frequents woods, and the more retired places; but in winter it approaches gardens and orchards, where in spring it makes great havoc among the buds of trees. It is probable, however, that it attacks the buds for the sake of the included insects.

The cock is in size equal to the hen, but has a flatter crown, and excels her in the beauty of his colors. In a state of nature, this bird has but three cries, all of which are unpleasant; but if man designs to instruct it methodically, and accustoms it to fine, mellower, and more lengthened strains, it will listen with attention; and the docile bird, whether male or female, without relinquishing its native airs, will imitate exactly, and sometimes even surpass, its master. It also learns to articulate words and sentences.

THE EUROPEAN LINNET.[2]

This favorite bird, which is universally admired for the melody of its voice, is in length, from the point of the bill to the end of the tail, five

[1] *Loxia vulgaris*, Lin.

[2] *Fringilla cannabina*, Lin. The genus *Fringilla* has the bill short, stout, straight and conical; upper mandible gibbous, depressed above, a little inclined at the point; nostrils basal, round, placed near the forehead, and partially concealed by the feathers in front; tarsus shorter than the middle toe, and the fore toes entirely divided; wings short, the third and fourth quills the longest; tail of varied form.

inches and a half; the bill is a bluish gray; the eyes are hazel; the upper parts of the head, neck, and back, are of a dark reddish brown, the edges of the feathers pale; the under parts are of a dirty reddish white; the breast is deeper than the rest, and in spring becomes a very beautiful crimson except in the female, whose breast is marked with only stripes of brown; the sides are spotted with brown likewise; the tail is brown, with white edges, except the two middle feathers, which have reddish margins; it is somewhat forked; the legs are brown.

The linnet is so much esteemed for the sweetness of his singing, that, by many persons, he is thought to excel all small birds. He has certainly a curious fine note of his own, little inferior to the most celebrated birds, and may be taught likewise to pipe or whistle the song of any other bird; but, as his own is so good, that trouble is unnecessary. He is, however, very apt in learning, and if brought up from the nest, will take the woodlark's or canary bird's song to perfection. In some instances he has been said to pronounce words with great distinctness.

The cock linnet may be known, either old or young, by two marks; first, the feathers on his back are much browner than those of the hen; secondly, by the white on the three or four longest feathers of the wing; if it appear clear, bright, and broad, and reach up to the quills, it is a true sign of a cock bird, for the white in the wing of the hen is much less, fainter, and narrower. In spring, too, as we have already mentioned, the breast of the cock is crimson.

These birds commonly build in a thick bush or hedge, and sometimes among furze, bushes, &c., making a small, pretty nest; the outside of bents, dried weeds, and straw, and the bottom all matted together; the inside of fine soft wool, mixed with down stuff, gathered from dried plants, with a few horse-hairs, made exceedingly neat and warm; on which she lays four, and sometimes five, white eggs, with fine red specks, especially at the blunt end; and has young ones by the middle of April or beginning of May. They are particularly fond of linseed, from which, it is supposed, they derive their name.

THE CANARY FINCH.[1]

This well known bird came originally from the Canary Islands, where they are still found in a wild state, as well as at the Cape Verd and Madeira Islands. In its native islands, a region equally noted for the beauty of its landscapes and the harmony of its groves, the canary bird is of a dusky gray color, and so different from those usually seen in Europe, that some

[1] *Fringilla Canaria*, Lin

have even doubted whether it be of the same species. With us, they have that variety of coloring usual in all domestic fowls; some white, some mottled, some beautifully shaded with green; but they are more esteemed for their note than their beauty, having a high, piercing pipe, as indeed all those of the finch tribe have, continuing it for some time in one breath without intermission, then raising it higher and higher by degrees, with great variety. The canary will breed freely with the goldfinch and linnet, and the produce is a beautiful bird, called a Mule.

The canary finch is a social and familiar bird, and is capable of contracting an attachment for the person to whom it belongs. It will perch on the shoulder of its mistress, and peck its food from her hand or her mouth It is also capable of being taught still more extraordinary feats. In 1820, a Frenchman exhibited four and twenty Canary Birds in London, many of which, he said, were from eighteen to twenty-five years of age. Some of these balanced themselves, head downward, on their shoulders, having their legs and tails in the air. One of them, taking a slender stick in its claws, passed its head between its legs, and suffered itself to be turned round, as if in the act of being roasted. Another balanced itself, and was slung backward and forward on a kind of slack rope. A third was dressed in military uniform, having a cap on its head, wearing a sword and pouch, and carrying a firelock in one claw; after some time sitting upright, this bird, at the word of command, freed itself from its dress, and flew away to the cage. A fourth suffered itself to be shot at, and falling down, as if dead, to be put into a little wheelbarrow, and wheeled away by one of its comrades; and several of the birds were at the same time placed upon a little firework, and continued there quietly, and without alarm, till it was discharged.

THE AMERICAN LINNET, OR PURPLE FINCH.[1]

This bird, owing to its change of color, has been described frequently as a different species. It is six inches in length. All the upper parts of the male are dark crimson. The female is of a brown olive color, streaked with black and white. The young are of the same color with the female, but the males gradually attain their full crimson plumage. These birds come to us in large flocks from the north, and feed on the seeds of poplar, buttonwood, juniper, and cedar trees. When the season is very severe, they proceed to the south as far as Georgia. In the spring they feed on apple and cherry blossoms.

The song of the purple finch is uncommonly sweet and voluble, surpassing even that of the European linnet. It is remarkable that the nest

[1] *Fringilla purpurea*, Gmel.

of this bird has never yet been seen by any naturalist, although they breed in the United States. Mr Audubon saw them feeding their young, who could not have been more than a few days old. The same author informs us that they frequently associate with the common crossbills.

THE SONG SPARROW.[1]

The song sparrow is the most generally diffused over the United States, and is the most numerous of all our sparrows; and it is far the earliest, sweetest, and most lasting songster. Many of them remain during the whole winter in close sheltered meadows and swamps. It is the first singing bird in spring. Its song continues through the summer and fall, and is sometimes heard even in the depths of winter. The notes or chant are short but very sweet, and frequently repeated, from a small bush or tree, where it sits chanting for an hour together. It is fond of frequenting the borders of rivers, meadows and swamps; and if wounded and unable to fly, will readily take to the water, and swim with considerable rapidity.

The song sparrow builds in the ground under a tuft of grass; the nest is formed of dry grass and horse-hair. It sometimes also builds in a cedar tree, five or six feet from the ground. It is six inches and a half long, and is of a chesnut color, marked and streaked with dirty white; the breast is spotted with pointed spots of chesnut.

THE CHIPPING SPARROW[2]

Is, perhaps, more generally known, and more familiar and domestic even, than the preceding species. He inhabits the city in summer, building in the branches of the trees in the streets and gardens, and gleaning up crumbs from the yard and door. This sociable habit, which continues chiefly during summer, is a singular characteristic. Towards the end of the summer, he takes to the fields and hedges, until the weather becomes severe, when he departs for the south. The chipping bird builds his nest most commonly in a bush, and lines it with cow hair. This little bird is five inches and a quarter long, the frontlet is black, crown chesnut, the upper parts are variegated with black and chesnut, and the under parts pale ash.

[1] *Fringilla melodia*, Wilson. [2] *Fringilla socialis*, Wilson.

THE FIELD SPARROW[1]

Is the smallest of all our sparrows, and frequents dry fields covered with long grass builds a small nest on the ground at the foot of a bush, and lines it with horse-hair. It has no song, but a kind of chirruping not much different from the chirpings of a cricket. There are multitudes of these little birds in North and South Carolina and Georgia. When disturbed, they take to the bushes, clustering so close together that a dozen may be shot at a time. This bird is five inches and a quarter in length; the upper parts are chesnut and black.

THE INDIGO BIRD[2]

Is numerous in the middle and eastern states, and in the Carolinas and Georgia. It is also known in Mexico and Nova Scotia. Its favorite haunts are about gardens, fields of clover, borders of woods, and roadsides, where it is frequently seen perched on fences. In its manners it is extremely neat and active, and a vigorous and pretty good songster. It mounts to the tops of the highest trees, and chants for half an hour at a time. Its song is not one continued strain, but a repetition of short notes, commencing loud and rapid, and falling by slow gradations till they seem hardly articulate, as if the little minstrel were quite exhausted; but after a pause of half a minute, it commences again as before. He sings with as much animation under the meridian sun in July as in the month of May, and continues his song till August. His usual note when alarmed, is a sharp *chip*. It feeds on insects and seeds.

Notwithstanding the beauty of his plumage, the vivacity of his song, the indigo bird is seldom seen domesticated. Its nest is built in a low bush, among rank grass, grain, or clover; suspended by two twigs, one passing up each side, and is composed of flax, and lined with grass. This bird is five inches long, the whole body of a rich sky blue, deepening in color toward the head, and sometimes varying to green.

THE YELLOW-BIRD, OR GOLDFINCH[3]

Bears a great resemblance to the canary, and in song is like the goldfinch of Britain, but it is in general so weak as to appear to proceed from a dis-

[1] *Fringilla pusilla*, Wilson. [2] *Fringilla cyanea*, Wilson.
[3] *Fringilla tristis*, Lin.

tance, when perhaps the bird is perched on a tree over your head. I have however heard them sing in cages with great animation and energy. In the spring, they associate in flocks, to bask and dress themselves in the morning sun, singing in concert for half an hour together; the confused mingling of their notes forming a kind of harmony not at all unpleasant. Their flight is not direct, but in alternate risings and sinkings, twittering as they fly at each successive impulse of the wings. They search the gardens in numbers, in quest of seeds, and pass by various names, such as lettuce-bird, sallad-bird, thistle-bird, yellow-bird, &c. They are very easily tamed.

The yellow-bird is four inches and a half in length: the male is of a rich lemon color. The wings and tail are black, edged with white. In the fall, this color changes to a brown olive, which is the constant color of the female. They build a nest in the twigs of an apple tree, neatly formed of lichen and soft downy substances.

The other individuals of the finch or sparrow tribe, which inhabit the United States, are too numerous for us here to particularize.

THE EUROPEAN GOLDFINCH[1]

Is the most beautiful bird which inhabits Europe, and is also one of the most docile and harmonious. It is of a gentle nature; soon becomes reconciled to the loss of freedom; and, as few birds are more intelligent and obedient, it may be taught a variety of entertaining tricks. When confined, it delights to view itself in a mirror. From its fondness for thistle seeds, it is sometimes called the thistlefinch. The female builds an admirably constructed and warm nest, generally in fruit trees, and lays five eggs.

ORDER V.—ZYGODACTYLOUS BIRDS

Birds of this order have the bill of various forms, more or less curved, or much hooked, and often straight and angular; feet always with two toes before, and two behind, and the exterior hind toe frequently reversible.

THE HONEY GUIDE.[2]

This remarkable bird is a native of Southern Africa, and has the faculty of pointing out to man, and to the quadruped called ratel, the nests of the

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[1] *Fringilla carduelis*, Lin.

[2] *Indicator major*. The genus *Indicator* has the bill short, depressed, dilated on the sides, a little bent and notched at the point; ridge distinct; nasal furrow large; nostrils basal, a little tubular; tarsus shorter than the external toe; the anterior toes united at the first joint; wings with the third feather the longest.

wild bees. It is exceedingly fond of honey and of the bee maggots, and its services are generally rewarded by leaving it a small portion of the spoil. In its external appearance it differs not much from the common sparrow, except in being somewhat larger, and of a lighter color. It has also a white spot on each shoulder, and its tail feathers are dashed with white. The morning and evening are its principal meal times; at least, it is then that it shows the greatest inclination to come forth, and with a grating cry of *cherr, cherr, cherr*, to excite the attention of the ratel, as well as of the Hottentots and colonists. Somebody then generally repairs to the place whence the sound proceeds; when the bird, continually repeating its cry of *cherr, cherr, cherr*, flies on slowly, and by degrees, towards the quarter where the bees have taken up their abode. The persons thus invited, accordingly follow; taking care at the same time not to frighten their guide by any unusual noise, but rather to answer it now and then with a soft and gentle whistle, by way of letting the bird know that its call is attended to. When the bees' nest is at some distance, the bird often makes long stages of flight, waiting for its sporting companions between each flight, and calling to them again to come on; but flies to shorter distances, and repeats its cry more frequently and with more earnestness, as they approach nearer to the nest. When the bird has sometimes, through its impatience, got too far ahead of its followers, but particularly when, from the unevenness of the ground, they have not been able to keep pace with it, it has flown back to meet them, and with redoubled cries has denoted still greater impatience, as though reproaching them for being so tardy. When it comes to the bees' nest, whether in the cleft of a rock, the hollow of a tree, or a cavity in the earth, it hovers over the spot for a few seconds; after which it sits in silence, and for the most part concealed, in some neighboring tree or bush, in expectation of what may happen, and with a view of receiving its share of the booty.

THE EUROPEAN CUCKOO.[1]

This singular bird is about fourteen inches in length, shaped somewhat like a magpie, and distinguished from all other birds by its round prominent nostrils. The head, neck, back, and wing-coverts are of a dove color; the throat is a pale gray; the breast and belly are white, crossed with wavy lines of black; the tail consists of ten feathers; the two middle ones black, with white tips; the others dusky, and marked with alternate spots of white on each side of the shaft. The legs are of a yellow color, and the

[1] *Cuculus canorus*, Lin. The genus *Cuculus* has the bill as long as the head, compressed, and slightly curved; nostrils basal, pierced in the margin of the mandible, and surrounded by a naked and prominent membrane; legs feathered below the knee; fore toes united at the base; hind toes divided, the exterior reversible; tail long, more or less graduated; the third quill feather the longest.

claws white. The plumage of the young birds is chiefly brown, mixed with a ferruginous hue and black. Having disappeared all the autumn and winter, it discovers itself in our country, early in the spring, by its well known call Its note is heard earlier or later, as the season seems to be more or less forward, and the weather more or less inviting. From the cheerful voice of this bird, the farmer may be instructed in the real advancement of the year. His note is pleasant, though uniform; and, from an association of ideas, seldom occurs to the memory without reminding us of the sweets of summer. There is a popular superstition, that he who hears the cuckoo before he has heard the nightingale, will be unsuccessful in love. To this idea Milton elegantly alludes in his Sonnet to the Nightingale.

It was once doubted, whether these birds were carnivorous; but Reaumur was at the pains of breeding up several, and found that they would feed

upon bread or corn; but flesh and insects were their favorite nourishment. Their gluttony is not to be wondered at, when we consider the capacity of their stomach, which is enormous, and reaches from the breast-bone to the vent.

The female cuckoo, in general, makes no nest of her own. She has, however, been known to rear her own young. But, usually, she repairs for that purpose to the nest of some other bird, generally the water-wagtail or hedge-sparrow, and having devoured the eggs of the owner, lays her egg in the place. She usually lays but one, which is speckled, and of the size of a blackbird's. This the fond, foolish bird hatches with great assiduity, and when excluded, finds no difference in the great ill looking changeling from her own. To supply this voracious creature, the credulous nurse toils with unusual labor, no way sensible that she is feeding up an enemy to her race, and one of the most destructive robbers of her future progeny.

This intrusion often occasions some disorder, for the hedge-sparrow, at intervals, while she is sitting, not only throws out some of her own eggs, but sometimes injures them in such a manner that they become addled; so that it frequently happens that not more than two or three of the parent bird's eggs are hatched; but it has never been observed that the egg of the cuckoo has either been thrown out or injured. The newly hatched cuckoo itself, also contrives to raise up the young, and throw them out of the nest, and nature seems to have provided for its doing so, by giving to it a broad

back, with a considerable depression in the middle; which shape it loses as soon as it has no longer any use for it. When the hedge-sparrow has set her usual time, and disengaged the young cuckoo and some of her own offspring from the shell, her own young ones, and any of her eggs that remain unhatched, are turned out of the nest. The young bird generally continues three weeks in the nest before it flies; and the foster parent-feeds it more than five weeks after this period.

All the little birds of the grove seem to consider the young cuckoo as an enemy, and revenge the cause of their kind by their repeated insults. They pursue it whenever it flies, and oblige it to take shelter in the thickest branches of some neighboring tree. All the smaller birds form the train of its pursuers; but the wryneck, in particular, is found the most active in the chase; and thence it has been called, by many, the cuckoo's attendant and provider. But it is very far from following with a friendly intention; it only pursues as an insulter, or a spy, to warn all its little companions of the cuckoo's depredations.

Such are the manners of this bird while it continues to reside, or to be seen amongst us. But in the first week in July, the old ones quit this country, and the young ones follow in succession; and as its new abode is not known, there are conflicting opinions on the subject. Some suppose that it lies hid in hollow trees; and others that it passes into warmer climates. Which of these opinions is true is uncertain, as there are no facts related on either side that can be totally relied on. To support the opinion that they remain torpid during the winter, at home, Willoughby introduces the following story, which he delivers upon the credit of another:—"The servants of a gentleman in the country, having stocked up, in one of their meadows, some old dry rotten willows, thought proper, on a certain occasion, to carry them home. In heating a stove, two logs of this timber were put into the furnace beneath, and fire applied as usual. But soon, to the great surprise of the family, was heard the voice of a cuckoo, singing three times from under the stove. Wondering at so extraordinary a cry in winter time, the servants ran and drew the willow logs from the furnace, and in the midst, one of them saw something move; wherefore, taking an axe, they opened the hole, and thrusting in their hands, first they plucked out nothing but feathers; afterwards they got hold of a living animal; and this was the cuckoo that had waked so very opportunely for its own safety. "It was, indeed," continues our historian, "brisk and lively, but wholly naked and bare of feathers, and without any winter provision in its hole. This cuckoo the boys kept two years afterwards, alive in the stove; but whether it repaid them with a second song, the author of the tale has not thought fit to inform us."

The most probable opinion on this subject is, that as quails and woodcocks shift their habitation in winter, so also does the cuckoo; but to what

country it retires, or whether it has been ever seen on its journey, are questions that we are wholly incapable of resolving.

Of this bird there are many kinds in various parts of the world, not only differing in their colors but their size. Latham make no less than forty species. There is a large spotted cuckoo in the south of Spain; and at the Cape of Good Hope there is a black-crested species. Only the common and spotted cuckoo have been seen in Europe.

THE AMERICAN CUCKOO[1]

Is sometimes called the cow-bird, from its note; and it is also called in Virginia, the rain crow, from being most clamorous just before rain. A traveller in our woods, in May or June, will sometimes hear, as he traverses the borders of deep, retired, high timbered hollows, an uncouth guttural sound or note, resembling the words *kowe*, *kowe*, *kowe*, *kowe*, *kowe*, beginning slowly, but ending so rapidly that the notes seem to run into each other, and *vice versa*. He will hear this frequently, without being able to discover the bird or animal from which it proceeds; as this bird is shy and solitary, seeking always the thickest foliage for concealment. It breeds all over the United States, from Boston to the Mississippi, preferring the borders of solitary swamps and apple orchards. The nest is usually fixed in an apple tree, and sometimes on a thorn in the woods. It is almost flat, and composed of twigs and weeds. When you approach the nest, the female throws herself on the ground, and feigns lameness to draw you off. They feed on caterpillars and insects. They are accused also of sucking the eggs of other birds, and sometimes eat berries.

This bird is thirteen inches long; the whole upper parts are drab, or quaker color, with greenish reflections. The under parts are pure white. The bill is yellow, and the legs and feet light blue.

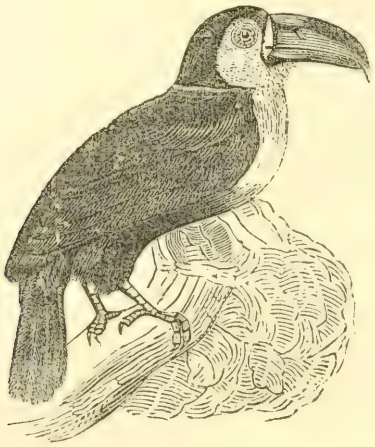
THE TOUCAN.

Of this extraordinary bird there are about fifteen species. We shall only describe the red-beaked toucan.[2] It is about the size of, and shaped like a jackdaw, with a large head to support its monstrous bill; this bill, from

[1] *Cuculus Carolinensis*, Wilson.

[2] *Ramphastos toco*, Lath. The genus *Ramphastos* has the bill cellular, thin, transparent, broader than the head at the base, convex above, serrated at the edges, and a little incurvated at the tip; nostrils vertical, concealed behind the corneous maw, surrounded by a membrane; tarsus as long as the external toe; the two anterior toes united at the second joint; tail short.

the angles of the mouth to its point, is six inches and a half; and its breadth in the thickest part is a little more than two. Its thickness near the head is one inch and a quarter; and it is a little rounded along the upper chap, the under side being rounded also; the whole of the bill extremely slight, and a little thicker than parchment. The upper chap is of a bright yellow, except on each side, which is of a fine scarlet color; as is also the lower chap, except at the base, which is purple. Between the head and the bill there is a black line of separation all round the base of the bill; in the upper part of which the nostrils are placed, and are almost covered with feathers, which has occasioned some writers to say, that the toucan has no nostrils. Round the eyes, on each side of the head, is a space of bluish skin, void of feathers, above which the head is black, except a white spot on each side joining to



the base of the upper chap. The hinder part of the neck, the back, wings tail, belly, and thighs, are black. The under side of the head, throat, and the beginning of the breast, are white. Between the white on the breast, and the black on the belly, is a space of red feathers, in the form of a new moon, with its horns upwards. The legs, feet, and claws, are of an ash color; and the toes stand like those of parrots, two before, and two behind.

This bird is easily tamed, and will become very familiar, and eat almost any thing offered to it; in general it feeds on fruits. In its wild state, it is a noisy bird, and is perpetually moving from place to place, in quest of food, going northward or southward, as the fruits ripen. Grapes, however, seem to be one of its most favorite articles of food. If these are plucked from the stalk, one by one, and thrown to it, the toucan will catch them with great dexterity before they fall to the ground.

These birds when in flocks, on retiring to rest, generally appoint one to watch during the night. While they are asleep, he sits perched at the top of a tree, above them, and makes a continual noise, resembling ill articulated sounds, moving also his head, during the whole time, to the right and left. For this reason the South Americans give to the toucan the name of preacher toucan.

The toucan builds its nest in the holes of trees, that are either formed by itself, or that from accident it meets with, and lays two eggs; and no bird better secures its young from external injury. It has not only birds, men, and serpents to guard against, but a numerous train of monkeys, still more prying, mischievous, and hungry, than all the rest. The toucan, however, sits in its hole, defending the entrance with its great beak; and if the monkey venture to offer a visit of curiosity, the toucan gives him such a welcome that he is soon glad to make his escape.

This bird is a native of Guiana and Brazil, and is said to be in great request in South America; both from the delicacy of its flesh, and on account of the beauty of its plumage, particularly the feathers of the breast. The skin of this part the Indians pluck off, and, when dry, glue to their cheeks, and this they consider as an irresistible addition to their beauty.

THE PARROT.[1]

This bird is said to have been first introduced into Europe, by Alexander the Great. It is equally remarkable for its beauty and its docility. But its chief attraction is to be found in its ability to utter articulate sounds, a gift which it possesses in far greater perfection than any other bird. Its voice also is more like a man's than any other; the raven is too hoarse, and the jay and magpie too shrill, to resemble the truth; but the parrot's note is of the true pitch, and capable of a variety of modulations. For this it is indebted to the form of its bill, tongue, and head. "Its bill, round on the outside and hollow within, has in some degree the capacity of a mouth, and allows the tongue to play freely; and the sound, striking against the circular border of the lower mandible, is there modified as on a row of teeth, while the concavity of the upper mandible reflects it like a palate; hence the animal does not utter a whistling sound, but a full articulation. The tongue, which modulates all sounds, is proportionably larger than in man, and would be more voluble, were it not harder than flesh, and invested with

[1] The genus *Psittacus*, which includes parrots, maccaws, cockatoos, &c., has the bill short, thick, gibbous, very strong, convex above and below, much bent and hooked at the point; lower mandible short, obtuse; base of the bill within a cere; head large, nostrils orbicular, pierced in the cere, open; legs short, robust; tarsus shorter than the external toe; the interior toes united at their base; tail of varied form.

a strong horny membrane." In addition to the talent of speech, the parrot is endowed with a strong memory and a high degree of sagacity.

The bill is fashioned with peculiarities; for the upper chap, as well as the lower, are both movable. In most other birds the upper chap is connected, and makes but one piece with the skull; but in these, and in one or two species of the feathered tribe more, the upper chap is connected to the bone of the head by a strong membrane, placed on each side, that lifts and depresses it at pleasure. By this contrivance they can open their bills the wider; which is not a little useful, as the upper chap is so hooked and so overhanging, that, if the lower chap only had motion, they could scarcely gape sufficiently to take any thing in for their nourishment.

The parrot, though common enough in Europe, will not, however, breed there. The climate is too cold for its warm constitution; and though it bears our winter when arrived at maturity, yet it always seems sensible of its rigor, and loses both its spirits and appetite during the colder part of the season.

The sagacity which parrots show in a domestic state, seems also natural to them in their native residence among the woods. They live together in flocks, and mutually assist each other against other animals, either by their courage or their notes of warning. They generally breed in hollow trees, where they make a round hole, and do not line their nest within. If they find any part of a tree beginning to rot from the breaking off of a branch, or any such accident, this they take care to scoop, and to make the hole sufficiently wide and convenient; but it sometimes happens that they are content with the hole which a woodpecker has wrought out with greater ease before them; and in this they prepare to hatch and bring up their young. The female lays two or three eggs, about the size of those of a pigeon, and marked with little specks. The natives are very assiduous in seeking their nests, and usually take them by cutting down the tree. By this means, indeed, the young parrots are liable to be killed; but if one of them survive, it is considered as a sufficient recompense. The old ones are shot with heavy arrows headed with cotton, which knock them down without killing them. The food commonly given to these birds consists of hemp-seed, nuts, fruits of every kind, and bread soaked in wine; they would prefer meat, but that kind of aliment has been found to make them dull and heavy, and to cause their feathers to drop off after some time. It has been observed that they keep their food in a kind of pouch, from which they afterwards throw it up, in the same manner as ruminating animals.

THE CAROLINA PARROT.[1]

This is the only species found native within the territory of the United States. The vast luxuriant tracts lying within the torrid zone, seem to be the favorite residence of those noisy, numerous, and richly plumaged tribes The Carolina parrot inhabits the interior of Louisiana, and the shores of the Mississippi, and Ohio, east of the Alleghanies. It is seldom seen north of Maryland. Their private places of resort are low, rich alluvial bottoms along the borders of creeks; deep and almost impenetrable swamps filled with sycamore and cypress trees, and those singular *salines* or *licks*, so interspersed over the western country Here, too, is a great abundance of their favorite fruits. The seeds of the cypress tree and beech nuts, are eagerly sought after by these birds.

The flight of the Carolina parrot is very much like that of the wild pigeon, in close compact bodies, moving with great rapidity, making a loud and outrageous screaming, like that of the red-headed woodpecker. Their flight is sometimes in a direct line, but most usually circuitous, making a

[1] *Psittacus Carolinensis*, Lin.

great variety of elegant and easy serpentine meanders, as if for pleasure. They generally roost in the hollow trunks of old sycamores, in parties of thirty or forty together. Here they cling fast to the sides of the tree, holding by their claws and bills. They appear to be fond of sleep, and often retire to their holes during the day, probably to take their regular *siesta*. They are extremely social and friendly towards each other.

They build in companies in hollow trees. This bird is thirteen inches long; the forehead and cheeks are orange red; down and round the neck a rich and pure yellow; the shoulder and bend of the wings also edged with rich orange red. The general color of the rest of the plumage is a bright yellowish silky green, with light blue reflections. It is altogether superior in elegance of figure, and beauty of plumage, to many of the foreign parrots. It is docile and sociable, and soon becomes perfectly familiar, but cannot be taught to speak. These birds are rapidly diminishing. According to Mr Audubon, very few of them are to be found north of Cincinnati and there are not, at present, half the number along the Mississippi, that existed there fifteen years ago.

THE COCKATOO[1]

Is distinguished from the parrot, by its head being adorned with a crest of long feathers, which is capable of being erected and lowered at will, and gives the bird a strikingly fine appearance. It is a native of the Molucca Islands, and other parts of the East Indies, where it is frequently known to build on the tops of houses. Like the rest of the parrot kind, it is capable of uttering sea phrases and sentences, with equal propriety of tone and volubility. It derives its name from its frequent repetition of the syllables *cock-a-too*. It delights in damp and marshy situations, and usually dwells near rivers or brooks, where it indulges in frequent bathing. In bathing, indeed, it feels a particular pleasure, even when a captive. Vegetable sub-

[1] *Psittacus cristatus*, Lin.

stances, chiefly seeds, supply its food, in the wild state. When domesticated, it lives on hemp-seed, the outer covering of which it detaches with much dexterity Of pastry and sweetmeats it is very fond.

THE MÁCCAW.[1]

The maccaws are characterized by their very broad and powerful beaks; the nakedness of the face, sometimes quite bare, at other times partially covered with lines of short and scattered feathers; and the tail, which surpasses the body in length, is regularly graduated and terminates in an acute apex. All of them are natives of America, inhabit the tropical regions, and are remarkable for their vivid coloring. They subsist on fruits and seeds. Of the latter, they prefer such as have a hard and shelly covering, and from these they extract the contents very skilfully.

THE BLUE MACCAW

Inhabits Brazil. It is entirely of a deep and brilliant blue color; with black back, legs, and claws. Round each of the eyes is a naked circle of bright yellow, and the cere is of the same hue. A specimen in the Tower, measures two feet four inches, from the top of the head to the extremity of the tail. Its upper mandible is five inches long; its lower is two.

[1] *Psittacus macao*, Lin.

THE PARROQUET.

This bird has a longer tail than the common parrot, and is less in size It also speaks with less facility, and is even more easily tamed. The handsomest species is the ring paroquet, which has a red circle encompassing the back of the neck, and ending under the lower chap of the bill. Its head and body are green, but of a fainter hue on the neck, breast, and whole of the under side; the belly being of so slight a green as to seem almost yellow.

The parroquet tribe in Brazil are most beautiful in their plumage, and the most talkative birds in nature.

THE WOODPECKER [1]

Birds of this tribe subsist for the most part upon worms and insects, contained in the trunks and branches of trees. For this purpose they are furnished with a straight, hard, strong, angular, and sharp bill, made for piercing and boring. They have a tongue of a very great length; round, ending in a sharp, stiff, bony thorn, dentated on each side, to strike ants and insects when dislodged from their cells. Their legs are short and strong, for the purposes of climbing. Their toes stand two forward, and two backward; which is particularly serviceable in holding by branches of trees. They have hard stiff tails, to lean upon when climbing. They feed only upon insects, and want that intestine which anatomists call the cœcum; a circumstance peculiar to this tribe only.

Of this bird there are more than fifty species, with many varieties. They form large colonies in the forests of every part of the world. They are found from the size of a jackdaw to that of a wren, and differ greatly in color and appearance; and agreeing only in the marks above-mentioned, or in those habits which result from so peculiar a conformation. All these species feed upon insects, and particularly on those which are found in decaying trees. When a woodpecker, by its natural sagacity, finds a hollow or decayed tree where there are worms, ants' eggs, or insects, it immediately prepares for its operations. Resting by its strong claws, and leaning on the ten hard, stiff, and sharp-pointed feathers of its tail, it begins to bore with its powerful beak, until it discloses the whole internal habitation. It then

[1] The genus *Picus*, which embraces the family of woodpeckers, has the bill long or medium size, straight, angular, wedge-shaped at the tip; nostrils basal, open, covered by setaceous feathers; tongue round, vermiform; legs strong; two toes before and two behind, rarely one behind; anterior toes joined at their base, the posterior divided; tail of twelve feathers, the lateral very short.

sends forth a loud cry, upon which the whole insect tribe are thrown into confusion, and run hither and thither seeking for safety; while the invader luxuriously feasts upon them at leisure, darting in its long tongue, and devouring the whole brood.

The woodpecker, however, does not confine its depredations solely to trees, but sometimes alights upon the ground, to try its fortune at an ant-hill. It first goes to their hills, which it pecks, in order to call them abroad; it then thrusts out its long red tongue, which being like a worm, and resembling their usual prey, the ants come out to settle upon it in great numbers; however, the bird, watching the properest opportunity, withdraws its tongue at a jerk, and devours the devourers. This stratagem it continues, till it has alarmed their fears, or till it is quite satisfied.

As the woodpecker is obliged to make holes in trees to procure food, so it is also to make cavities still larger to form its nest and to lay in. This is performed, as usual, with the bill; although some have affirmed that the animal uses its tongue as a gimlet, to bore with. But this is a mistake; and those that are curious, may often hear the noise of the bill making its way in large woods and forests. The woodpecker chooses, however, for this purpose, trees that are decayed, or wood that is soft, like beech, elm, and poplar. In these, with very little trouble, it can make holes as exactly round as a mathematician could with compasses. One of these holes the bird generally chooses for its own use, to nestle and bring up its young in; but as they are easily made, it is delicate in its choice, and often makes twenty before one is found fit to give entire satisfaction.

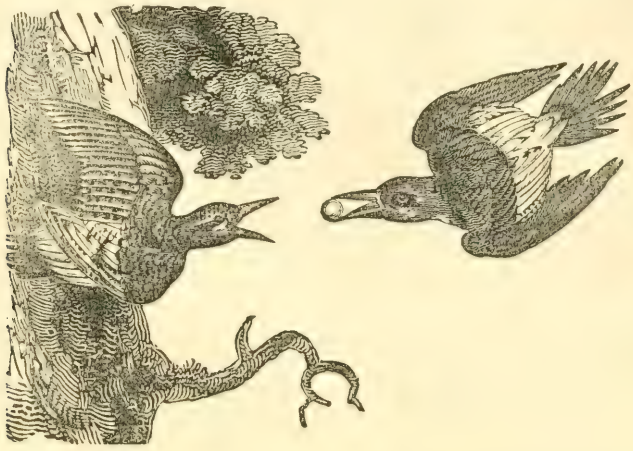
The woodpecker takes no care to line its nest with feathers or straw; its eggs are deposited in the hole, without any thing to keep them warm, except the heat of the parent's body. Their number is generally five or six; always white, oblong, and of a middle size. When the young are excluded, and before they leave the nest, they are adorned with a scarlet plumage under the throat, which adds to their beauty.

THE RED-HEADED WOODPECKER[1]

Is one of the most remarkable of American birds. Its tri-colored plumage, red, white, and black, is so striking and characteristic, and his predatory habits in the orchards and corn-fields, added to his numbers and fondness for hovering along the fences, so very notorious, that almost every child is acquainted with the red-headed woodpecker. Towards the mountains, particularly in the vicinity of creeks and rivers, these birds are extremely abundant, especially in the latter part of the summer. Wherever you travel

[1] *Picus erythrocephalus*, Lin.

in the interior at that season, you hear them screaming from the adjoining woods, rattling on the dead limbs of trees, or on the fences, where they are perpetually seen flitting from stake to stake on the roadside before you. Wherever there are trees of the wild cherry, covered with ripe fruit, there



you see them busy among the branches; and in passing orchards, you may easily know where to find the earliest, sweetest apples, by observing those trees on or near which this bird is skulking; for he is so excellent a connoisseur in fruit, that wherever an apple or pear is found broached by him, it is sure to be among the ripest and best flavored. When alarmed, he seizes a capital one by sticking his open bill deep into it, and bears it off to the woods. When the Indian corn is in its ripe, succulent, and milky state, he attacks it with great eagerness, opening a passage through the numerous folds of the husk, and feeding on it with voracity. The girdled or deadened timber, so common among the corn-fields in the back settlements, are his favorite retreats, whence he sallies out to make his depredations. He is fond of the ripe berries of the sour gum, and pays regular visits to the cherry trees, when loaded with fruit. Towards fall, he often approaches the barn or farmhouse, and raps on the shingles and weather-boards. He is of a gay and frolicsome disposition; and half a dozen of the fraternity are frequently seen diving and vociferating round the high dead limbs of some tree, pursuing and playing with each other, amusing the passenger with their gambols. Their note or cry is shrill and lively, and so much resembles that of a species of tree-frog, which frequents the same tree, that it is sometimes difficult to distinguish the one from the other.

Though this bird occasionally regales himself on fruit, yet his natura

and most useful food is insects, particularly those numerous and destructive species that penetrate the bark and body of the tree, to deposit their eggs and larvæ, the latter of which are well known to make immense havoc. In fact, insects form at least two thirds of his subsistence. He searches for them with a dexterity and intelligence, I may safely say, more than human; he perceives by the exterior surface of the bark where they lurk below; when he is dubious, he rattles vehemently on the outside with his bill, and his acute ear distinguishes the terrified vermin skrinking within to their inmost retreats, where his pointed and barbed tongue soon reaches them. The masses of bugs, caterpillars, and other larvæ which I have taken from the stomachs of these birds have often surprised me. These larvæ, it should be remembered, feed not only on the buds, leaves and blossoms, but on the very vegetable life of the tree,—the newly forming bark and wood; the consequence is, that whole branches and trees decay under the silent ravages of these destructive vermin. It must therefore be allowed, that the services of this useful bird more than compensate for his petty thefts on apple and cherry trees.

These birds build their nests in the body or large limbs of trees, taking in no materials, but smoothing it within to the proper shape and size. The female lays six eggs. Notwithstanding the care which this bird takes to place its young beyond the reach of enemies, yet there is one deadly foe against whose depredations there is no security. This is the black snake, who frequently glides up the trunk of the tree, and, like a skulking savage, enters the woodpecker's peaceful apartment, devours the eggs or helpless young, in spite of the cries and flutterings of the parents; and if the place be large enough, coils himself up in the spot they occupied, where he will sometimes remain several days; and often terrifies the eager schoolboy, who thrusts his arm into the cavity after the callow brood. Several adventures of this kind have come to my knowledge.

This bird is nine inches and a half long; the head and neck are deep scarlet; the back, wing-coverts, and tail, black; the lower part of the back, and whole under parts are white.

THE IVORY-BILLED WOODPECKER.[1]

In strength and magnitude, stands at the head of the whole class of woodpeckers hitherto discovered. He may be called the king or chief of his tribe; and nature seems to have designed him a distinguished characteristic, in the superb carmine crest and bill of polished ivory with which she has ornamented him. His eye is brilliant and daring, and his whole frame admirably adapted for his mode of life. His manners have also a dignity in them

[1] *Picus principalis*, Lin.

superior to the common herd of woodpeckers. The royal hunter before us, scorns the humility of searching for prey in trees, shrubbery, orchards, rails, and old prostrate logs, and seeks the most towering trees of the forest; seeming particularly attached to those prodigious cypress swamps, whose crowded giant sons stretch their bare and blasted, or moss-hung arms midway to the skies. In these almost impenetrable recesses, amid ruinous piles of decaying timber, his trumpet-like note and loud strokes resound through the solitary savage wilds, of which he seems the sole lord and inhabitant Wherever he frequents, he leaves numerous monuments of his industry behind him. We there see enormous pine trees with cart-loads of bark lying around their roots, and chips of the trunk itself in such quantities as to suggest the idea that half a dozen axe-men had been at work there the whole morning. But examine the tree closely where he has been at work, and you will soon perceive, that it is neither for amusement nor mischief that he slices off the bark, or digs his way into the trunk. The sound and healthy tree is not the least object of his attention. The diseased, infested with insects and hastening to putrefaction, are his favorites; there the deadly crawling enemy have formed a lodgment between the bark and tender wood, to drink up the very vital part of the tree.

This bird is not migratory: it breeds in the Carolinas, and builds a large and capacious nest in a cypress tree. It is called by the natives the large *Logcock*. Its food consists entirely of insects and larvæ. Its common note, repeated every three or four seconds, very much resembles the tone of a trumpet, seeming to be near at hand, though perhaps one hundred yards off. This it utters while mounting along the trunk, or digging into it. At these times it has a stately and novel appearance, and his note instantly attracts the notice of a stranger.

The ivory-billed woodpecker is twenty inches long; the general color is black, glossed with green; fore part of the head black; the rest of the crest of a most splendid red, spotted at the bottom with white; the beak is of the color and consistence of ivory, prodigiously strong, and elegantly fluted.

THE PILEATED WOODPECKER[1]

Is the next in size, and may be styled the great northern chief, though his range extends from Canada to the Gulf of Mexico, over the whole range of the United States. In Pennsylvania and the northern states he is called the *black woodcock;* in the southern states, the lesser *logcock*. He is very numerous in all the tracts of high timbered forests, in the neighborhood of large rivers, where he is noted for making a loud and incessant cackling be

[1] *Picus pileatus*, LIN.

fore wet weather, making the woods echo to his outcry. Almost every trunk in the forests bears the marks of his chisel. Whether engaged in digging, flying, or climbing, he seems perpetually in a hurry. He is extremely hard to kill, clinging close to the tree after he has received his mortal wound; nor yielding up his hold but with his expiring breath. He can rarely be reconciled to confinement.

This bird is not migratory, but bears the extremes of both the arctic and torrid regions. Neither is he gregarious, for it is rare to see more than one or two in company. Their nest is built in the hole of a tree, dug out by themselves: it is eighteen inches long; the general color is a dusky brownish black; the head is ornamented with a conical cap of bright scarlet; the chin is white, with two scarlet mustaches; the upper part of the wings is white, the lower part black, but the white is never seen except when the bird is flying.

THE YELLOW-BELLIED WOODPECKER[1]

Is one of our resident birds. It visits our orchards in the fall in great numbers, and is occasionally seen during the whole winter and spring; but seems to seek the depths of the forest to rear its young in; for during the summer it is rarely seen. It inhabits the continent from Cayenne to Virginia. They are common in Kentucky and Ohio, and have been seen near St. Louis. The only nest of this bird which I have met with was in the body of an old pear tree. The hole was almost exactly circular, small for the size of the bird, so that he crept in and out with difficulty; but suddenly widened by a small angle, and then running downwards about fifteen inches. On the smooth solid wood were four eggs. The principal food of these birds is insects; and they seem particularly fond of frequenting orchards, boring the trunks of the apple trees in their eager search for them. In the morning they are extremely active. Their cry cannot be described by words.

THE HAIRY WOODPECKER[2]

Is, like the former, a haunter of orchards, and borer of apple trees, an eager hunter of insects in old stumps and rails, and rotten branches and crevices of the bark. In the spring, he retires into the woods and seeks out a branch already hollow, or cuts out an opening for himself. In the latter case he digs horizontally first, and then downwards, carrying up the chips with his bill, and scraping them out with his feet. They sometimes breed in an

[1] *Picus varius*, WILSON. [2] *Picus villosus*, LIN.

orchard, or dig a hole in an old stake of a fence. They frequently approach the farmhouses and skirts of the town. In Philadelphia, they frequent the old willow and poplar trees. Their cry is strong, shrill, and tremulous; they have also a single note or chuck, which they often repeat in an eager manner as they hop about and dig in the crevices of the trees. They inhabit the continent from Hudson's Bay to Carolina and Georgia. This bird is nine inches long; the hind head is scarlet mixed with black; under the bill are long hairs thrown forwards and upwards. The back is black, divided by a strip of white, the feathers of which resemble hairs; wings black, spotted with white, the under parts are pure white. The great mass of hairs that cover the nostril appears to be designed as a protection to the front of the head, when the bird is engaged in digging holes in the wood. In flight these birds sink and rise alternately, uttering a loud tremulous scream as they set off and alight. They are hard to kill.

THE DOWNY WOODPECKER[1]

Is the smallest of all, and exactly resembles the former in tints and markings, and in almost every thing but its diminutive size. Its principal characteristics are diligence, familiarity, and a strength and energy in the head and neck, which are truly astonishing. Mounted on the infected branch of an old apple tree, where insects have lodged between the bark and the wood, he labors sometimes for half an hour incessantly at the same spot, till he has succeeded in dislodging them. At these times you may walk pretty close to the tree without in the least embarrassing him: the strokes of his bill are distinctly heard several hundred yards off; and I have known him to work for two hours together on one tree. He has a single note or chink, which he frequently repeats: and when he flies off, he utters a rather shriller cry, quickly reiterated. Of all our woodpeckers, none rid the apple-trees of so many vermin as this; digging off the moss, and probing every crevice. His industry is unequalled, and almost incessant.

THE RED-BELLIED WOODPECKER[2]

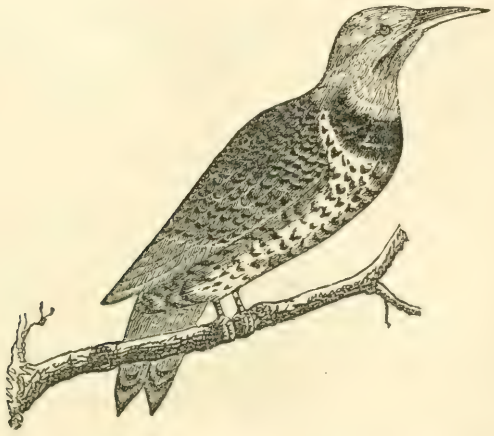
Possesses all the restless and noisy habits of its tribe. It is more shy than the red-headed one. It is also more solitary. It prefers the largest, high-timbered woods and tallest decayed timbers of the forest; seldom appearing near the ground, on the fences, or in orchards; yet where the trees have been deadened in fields of Indian corn, it is pretty numerous, and it feeds

[1] *Picus pubescens*, Lin. [2] *Picus Carolinus*, Lin.

eagerly on that grain. Its voice is hoarser than any of the others; and its usual note, *chow*, has often reminded me of the barking of a little lap-dog. It is a most expert climber, possessing extraordinary strength in the muscles of its feet and claws, and moves about the body and horizontal limbs of the trees with equal facility in all directions. It rattles like the rest of its tribe on the dead limbs with such violence, as to be heard in still weather for more than half a mile; and listens to hear the insects it has alarmed. It digs its nest in the lower side of some lofty branch, the male and female working together.

This bird is ten inches in length. The upper part of the head, neck, and back are of a brilliant, golden, glossy red; the breast is ash, and the belly bloody red. The back is black, crossed with bars of white. It inhabits a large extent of country.

THE GOLDEN-WINGED WOODPECKER[1]



Is well known to our farmers and junior sportsmen, who take every opportunity of destroying him; the former, for the supposed trespasses he commits on their Indian corn, or the trifle he will bring in market; and the latter, for the mere pleasure of destruction, and perhaps for the flavor of his flesh, which is in general esteem. Early in April these elegant birds begin to prepare their nests, which is built in the hollow body or branch of a tree, sometimes in an old apple tree. The male and female work together, and encourage each other by mutual caresses. They employ themselves in hollowing the tree for several days, and may even be heard late in the evening,

[1] *Picus auratus*, Lin.

thumping like carpenters. They carry in no materials for their nest. Their food varies with the season. As the common cherries, wild cherries, and berries of the sour gum ripen, he regales plentifully on them; but his chief food is wood-lice and the young and larvæ of ants. He is very fond of corn, and visits the farmer's grounds too frequently to remain unpunished, as the farmer destroys him on every opportunity.

This bird has the back and wings of a burnt umber, marked with streaks of black; the breast is ornamented with a broad crescent of deep black; the belly is light yellow, spotted with innumerable round spots of black; the inner side of the wings and tail are of a beautiful golden yellow. They inhabit America from Hudson's Bay to Georgia, and have been found on the North-West coast. They arrive at Hudson's Bay in the spring.

ORDER VI.—ANISODACTYLI.

Birds of this order have the bill more or less arched, often straight, always subulate and slender; feet with three toes before and one behind, the exterior united at the base to that in the middle, the hinder one generally long, and all provided with long and bent claws.

THE NUTHATCH[1]

Weighs near an ounce, and is five inches and three quarters in length. The bill is strong and straight, and three fourths of an inch long. The upper part of the plumage is of a fine bluish gray; a black stroke runs from the mouth to the eye. The cheeks are white, and the breast and belly of a dull orange color. This bird runs up and down the bodies of trees like the woodpecker. It feeds on insects and nuts, which it stores in the hollow parts of the tree. It is a pretty sight, says Willoughby, to see her fetch a nut out

[1] *Sitta Europea*, Lin. The genus *Sitta* has the bill straight, cylindrical, slightly compressed, tip acuminated, nostrils basal, rounded, partly concealed by reflected bristles, tongue short, horny; three toes before, the exterior joined at its base to the middle one; hind toe very long, with a long hooked claw; tail composed of twelve feathers.

of her hoard, place it in a chink, and then, standing above it, striking it with all its force till it breaks the shell and catches up the kernel. Doctor Plot says, that this bird, by putting its bill into the crack of a tree, can produce a violent sound, as if it was rending asunder, which may be heard, at least one hundred and twenty yards. In some countries this bird, from the noise which it produces in the manner above stated, is called the logger-head.

WHITE-BREASTED NUTHATCH.[1]

The white-breasted nuthatch is common almost everywhere in the woods of North America; and may be known at a distance by the notes *quank, quank*, frequently repeated, as he moves up and down in spiral circles around the body and branches of the tree, shelling off pieces of bark in search of spiders, ants, insects, and their larvæ. He rests and roosts with his head downwards, and appears to possess a curiosity not common to birds; frequently descending very slily within a few feet of the root of a tree where you happen to stand, stopping head downwards, stretching out his neck in a horizontal position, as if to reconnoitre your appearance, and, after several minutes of silent observation, wheeling round, he again mounts with fresh activity, piping his orisons as before. Strongly attached to his native forests, he seldom forsakes them, and in the rigor of the severest winter, his note is still heard in the bleak and leafless woods.

This bird builds its nest in the hole of a tree, in the hollow rail of a fence, and sometimes in the wooden crevice under the eaves. The male is extremely attentive to the female while sitting, and supplies her regularly with sustenance, calling her and offering her whatever he has brought, with the most endearing tenderness. Sometimes he stops merely to inquire how she is, and to lighten the tedious moments with his soothing chatter. When both are feeding on the same tree, he is perpetually calling to her; and from the momentary pause he makes, it is evident that he feels pleased to hear her reply.

There are two or three species of the nuthatch besides the above, found in America.

[1] *Sitta Carolinensis*, Wilson.

THE CREEPER[1]

Is the smallest of European birds, if we except the crested wren, and weighs only five drachms. The bill is hooked like a sickle. The upper part of the body is variegated with brown and black, and the breast and belly are of a silver white. This bird is very common in England, though, from its extreme agility in eluding the eye of the spectator, it is less frequently seen than other common birds. It feeds upon insects, and builds in the holes of trees. The nest is formed of grass, lined with feathers. Along the stems of trees it runs readily in every direction.

Nearly eighty species, foreign and domestic, have been enumerated of this bird. The color of the foreign species is in general olive green. It inhabits the Sandwich Islands, and is one of the birds, whose plumage the natives make use of for their feathered garments.

THE HUMMING-BIRD.[2]

Of this charming little animal there are not less than sixty species, from the size of a small wren down to that of a bee. An European could never have supposed a bird existing so very small, and yet completely furnished with a bill, feathers, wings, and intestines, exactly resembling those of the largest kind. A bird not so big as the end of one's little finger, would probably be supposed but a creature of imagination, were it not seen in infinite numbers, and as frequent as butterflies in a summer's day, sporting in the fields of America, from flower to flower, and extracting their sweets with its little bill.

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[1] *Certhia familiaris*, Lin. The genus *Certhia* has the bill long, or of medium length, more or less curved, triangular, compressed, slender; nostrils basal, naked, pierced horizontally, and half closed by a membrane; three toes before, the outer united at its base to the intermediate one; claws much hooked, that on the hind toe longest; tail graduated with stiff pointed shafts; fourth quill feather longest.

[2] The genus *Trochilus* which embraces the humming-bird, has the bill long, straight, or arcuated, tubular, very slender, base depressed, acuminated; upper mandible almost concealing the lower; tongue long, extensible, bifid, and tubular; nostrils open before, covered by a broad membrane; legs very short; tarsus shorter than the middle toe the three anterior toes nearly divided; wings graduated, the first feather longest.

The smallest humming-bird is about the size of a bee, and weighs no more than twenty grains. The feathers on its wings and tail are violet brown, but those on its body and under its wings are of a greenish brown; with a fine red cast or gloss, which no silk or velvet can imitate. The bill is black, straight, slender, and of the length of three lines and a half.

There are almost all colors of these beautiful animals, crimson, green, emerald, white breasted, and spotted. Some of them with and some without crests. The eyes of most of them are very small, and as black as jet.

It is inconceivable how much these add to the high finishing and beauty of a rich luxurious western landscape. As soon as the sun is risen, the humming-birds of different kinds are seen fluttering about the flowers, without even lighting upon them. Their wings are in such rapid motion, that it is impossible to discern their colors, except by their glittering. They are never still, but continually in motion, visiting flower after flower, and extracting its honey. For this purpose they are furnished with a forked tongue, that enters the cup of the flower, and extracts its nectared tribute. Upon this alone they subsist. The rapid motion of their wings brings out a humming sound, whence they have their name.

The nests of these birds are not less curious than the rest; they are suspended in the air, at the point of the twigs of an orange, a pomegranate, or a citron tree; sometimes, even in houses, if they find a small and convenient twig for the purpose. The female is the architect, while the male goes in quest of materials, such as cotton, fine moss, and the fibres of vegetables. The nest is about the size of a hen's egg cut in two. They lay two eggs at a time, and never more, about the size of small peas, and as white as snow, with here and there a yellow speck. The time of incubation continues twelve days; at the end of which, the young ones appear, and are much about the size of a bluebottle fly.

It is a doubt whether or not these birds have a continued note in singing. All travellers agree that, beside the humming noise produced by their wings, they have a little interrupted chirrup; but Labat asserts, that they have a most pleasing melancholy melody in their voices, though small and proportioned to the organs which produce it. It is very probable that, in different places, their notes are also different; and as there are some that continue torpid all the winter, there may likewise be some with agreeable voices, though the rest may in general be silent.

Small as the humming-bird is, it has great courage and violent passions. If it find that a flower has been deprived of its honey, it will pluck it off, throw it on the ground, and sometimes tear it to pieces; and it often fights with a desperate fury which is astonishing in a creature of such diminutive size. It will even allow a man to come within two yards of it, before it will take to flight. Humming-birds are caught by blowing water on them from a tube, or shooting at them with sand.

THE HUMMING-BIRD OF THE UNITED STATES.[1]

This little bird is remarkable for its beauty, minuteness, want of song, and manner of feeding. There are upwards of seventy species in America and the adjacent islands, one only of which is found in the United States. This is found in Canada in great numbers, where it arrives from the south. It is wonderful how such a little creature can make its way over such extensive regions of lakes and forests. But its very *minuteness*, the rapidity of its flight, and its admirable instinct and courage, are its guides and protectors.

The nest of this little bird is fixed on the upper side of the branch of a tree. Instances have been known of its building on an old moss-grown trunk, or on a strong weed in the garden; but these cases are rare. This nest is about an inch in diameter, an inch deep, formed of lichen, wings of certain flying seeds, and of a downy substance from the great mullein. The eggs are two, of a pure white. If any one approaches the nest, the little proprietors dart around with a humming sound, frequently passing within a few inches of your head. His only note is a single chirp, not louder than that of a cricket or grasshopper.

The humming-bird is extremely fond of tubular flowers, particularly of the blossoms of the trumpet flower. When arrived before a thicket of these, that are full blown, he suspends himself on wing for the space of two or three seconds, so steadily, that his wings become invisible, or only like a mist; the glossy golden green of his back, and fire of his throat, dazzling in the sun, form altogether an interesting spectacle. When he alights, he prefers the small dead twigs of a bush where he dresses and arranges his plumage with great dexterity. He is one of the few birds that is universally beloved. His flight from flower to flower greatly resembles that of a bee, but is infinitely more rapid. He poises himself on the wing, while he thrusts his long slender tongue into the flowers in search of food. He sometimes enters a room by the window, examines the bouquets of flowers, and passes out by the opposite door or window. It has hitherto been supposed to subsist entirely on the honey which it extracts from flowers. But they are known to feed on insects, being seen for half an hour at a time, darting at little groups of insects with the dexterity of the flycatcher.

The humming-bird is three inches and a half in length, and of a rich golden green color, while the feathers round his throat are black, crimson, and orange, mingled together, giving him a very brilliant appearance.

[1] *Trochilus colubris*, Lin.

THE HOOPOE.[1]

Of this bird there are only two species known to Europeans, one of which is, however, diffused over the whole of the Old Continent. It weighs about twelve ounces, and is twelve inches in length, the extent of its wings being nineteen inches across. The bill is long, black, and somewhat curved. The neck is pale reddish brown; the breast and belly white; the lesser coverts of the wing light brown; the back, scapulars, and wings crossed with black and white, the rump white, and the tail white, marked with black in the form of a crescent. But the distinguishing character is a beautiful crest of about two inches high, which is of a pale orange tipped with black, and which the bird can erect at pleasure. The food of this bird is insects. It is a solitary bird, two of them being seldom found together. In some places it is accounted good eating.

ORDER VII.—ALCYONES.

Birds of this order have the bill middle sized or long, pointed, almost quadrangular, and either slightly arched or straight; tarsus very short three toes before, united, and one behind. These birds fly with great celerity. Their movements are quick and abrupt, and they neither walk nor climb. They seize their food on the wing, and often from the surface of the water, and nestle in holes on the banks of rivers. They moult only once a year; and the females and young are not very dissimilar from the males and mature birds.

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[1] *Upupa epops*, Lin. The genus *Upupa* has the bill very long, slightly arched, slender, triangular, compressed; nostrils basal, lateral, ovoid, open, and surmounted with feathers in front; taree toes before, the exterior united to the middle one to the first joint; one behind; tail square, of ten feathers.

THE BEE-EATER[1]

Is well known on the continent of Europe, though it has never been seen in England. It is about ten inches in length. The forehead is of a blue green; the top of the head, and upper part of the back, chesnut and green; the throat is yellow; and the under parts of the body blue green. Flocks of these birds are seen in Germany. It feeds chiefly upon insects, and is good food. There are about twenty different species, foreign and domestic.

The Indian bee-eater is about the size of a common blackbird. Its bill is nearly two inches long, and its eyes are of a fine red; on each side of the head extends a black stroke, which begins at the corners of the mouth, and passes beyond the eyes. The base of the upper chap, and under the chin, is covered with bright pale blue feathers; the upper and back part of the head are of a dusky yellow; the back and wings of the same color, only shaded pretty strongly with a green; the tips of the quill feathers brown, the breast and belly green; the thighs and under part near the vent, of a pale yellow, with a small green mixture. The tail consists of about twelve feathers; the outermost on each side are of a green and yellow mixture, about three inches in length, the two middlemost twice that length, ending in sharp points, of a brown or dusky color; the legs and feet black.

They principally feed on bees, beetles, grasshoppers, and other insects. They build in hollow places or caverns five or six feet deep, and lay six or seven eggs.

THE EUROPEAN KINGFISHER.[2]

This kingfisher is not much larger than a swallow; its shape is compact; the legs, however, are disproportionably small, and the bill disproportionably long; it is two inches from the base to the tip; the upper chap black, and the lower yellow; but the colors of this bird atone for whatever is inelegant in its form; the crown of the head, and the coverts of the wings, are of a deep blackish green, spotted with bright azure; the back and tail are of the most resplendent azure; the whole under side of the body is orange colored; a broad mark of the same passes from the bill beyond the eyes; beyond that is a large white spot; the tail is short, and consists of twelve feathers of a

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[1] *Merops apiaster*, Lin. The genus *Merops* has the bill sharp edged, pointed, slightly curved; nostrils basal, lateral, ovoid, concealed by hairs directed forwards; tarsus short, three front toes united, the exterior to the second joint, the interior to the first joint of the middle toe; hind toe broad at its base; the second wing feather the longest.

[2] *Alcedo ispida*, Lin. The genus *Alcedo* has the bill long, straight, quadrangular, pointed, edged, and very rarely depressed; nostrils basal, lateral, pierced obliquely, almost wholly closed by a naked membrane; legs short, naked above the knee; exterior toe united to the second joint, and the interior to the first joint of the middle toe.

rich deep blue; the feet are of a reddish yellow, and the three joints of the utmost toe adhere to the middle toe, while the inner toe adheres only by one.

From the diminutive size, the slender short legs, and the beautiful colors of this bird, no person would suppose it one of the most rapacious little animals that skims the deep. Yet it is forever on the wing, and feeds on fish, which it takes in surprising quantities, when we consider its size and figure. It chiefly frequents the banks of rivers. There it preys on the smaller fish, and sits frequently on a branch projecting over the current; there it remains motionless, and often watches whole hours to catch the moment when a little fish springs under its station; it dives perpendicularly into the water, where it continues several seconds, and then brings up the fish, which it carries to land, beats to death, and then swallows; but it afterwards throws up the undigestible parts. When this bird cannot find a projecting bough, it sits on some stone near the brink, or even on the gravel; but the moment it perceives the fish, it takes a spring upward, of twelve or fifteen feet, and drops perpendicularly from that height. Often it is observed to stop short in its rapid course, and remain stationary, hovering like a hawk, over the same spot for several seconds. Such is its mode in winter, when the muddy swell of the stream, or the thickness of the ice, constrains it to leave the rivers, and ply along the sides of the unfrozen brooks. In this way it traverses many leagues. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colors.

The kingfisher builds its nest by the river-side, in a hole which it burrows out itself, or in the deserted hole of a rat. In these holes, which, from the remains of fish brought there, are very fœtid, the kingfisher is often found with from five eggs to nine. There the female continues to hatch, even though disturbed; and though the nest be robbed, she will again return and lay there. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed; and she, contrary to most other birds, is found plump and fat at that season.

THE BELTED KINGFISHER.[1]

This is a general inhabitant of the banks and shores of all our fresh water rivers from Hudson's Bay to Mexico, and is the only species of its tribe found within the United States. This last circumstance, and its characteristic appearance, make it universally known here. Like the love-lorn swains, of whom poets tell us, he delights in murmuring streams and falling waters; not however merely that they may sooth his ear, but for a gratifica-

[1] *Alcedo alcyon*, Lin.

tion somewhat more substantial. Amidst the roar of a cataract, or over the foam of a torrent, he sits perched upon an overhanging bough, glancing his piercing eye in every direction below for his scaly prey, which, with a sudden circular plunge, he sweeps from their native element and swallows in an instant. His voice, which is not unlike the twirling of a watchman's rattle, is naturally loud, harsh, and sudden, but is softened by the sound of the brawling streams, and cascades, among which he generally rambles. He courses along the windings of the brook, or river, at a small height above the surface. Sometimes suspending himself by the rapid action of his

wings, ready to pounce on the prey below; now and then settling on an old dead overhanging limb to reconnoitre. Mill-dams are particularly visited by this feathered fisher; and the sound of his pipe is as well known to the miller, as the rattling of his own hopper.

Rapid streams, with high perpendicular banks, particularly if they be of a hard clayey or sandy nature, are also favorite places of resort for this bird; not only because in such places the fish are more exposed to view, but because those steep and high banks are the chosen situations for his nest. Into these he digs with his bill horizontally, sometimes four or five feet. The nest is built of few materials. They are very tenacious of their haunts, breeding for several successive years in the same hole, and do not readily forsake it, even though it be visited. Many fabulous stories have been related by the ancients, of the nest and manner of hatching of the kingfisher

This bird is twelve inches and a half long; the whole upper parts are a bluish slate color, round the neck is a collar of pure white; the head is large, and crested; the feathers are long, and generally erect; the breast is blue and brown, the under parts white.

ORDER VIII.—CHELIDONES.

Birds of this order have the bill very short, much depressed, and very wide at the base; the upper mandible curved at the point; legs short, three toes before, either entirely divided, or connected at the base by a short membrane, the hinder often reversible; claws much hooked; wings long. The flight of these birds is rapid and abrupt, their sight piercing; neck short; throat wide, bill broad, and often gaping for the reception of insects, which constitute their only food.

THE SWALLOW.[1]

The swallow tribe is very numerous. These birds have a peculiar twittering voice, fly with extreme rapidity, scarcely ever walk, and perform all their functions while they are on the wing or sitting. Their plumage is glossed with a rich purple.

To the martens, and other small birds, the swallow announces the approach of birds of prey. By a shrill alarming note, he summons around him all his own species and the martens, as soon as an owl or hawk appears. The whole band then pursue and strike their enemy till they expel him from the place; darting down on his back, and rising in a perpendicular line with perfect security. The swallow will also strike at cats while they are climbing the roofs of houses.

Early in the spring, when the solar beams begin to rouse the insect tribes from their annual state of torpidity, the swallow is seen returning from its long migrations beyond the ocean; and in proportion as the weather grows warmer, and its insect supply increases, it gathers strength and activity. The breed of the swallow ought to be cherished, as the bird is of infinite service to mankind, by destroying myriads of vermin which would prove fatally prejudicial to the labors of the husbandman.

Of the swallow tribe, all the birds have been observed to drink while in their flight, sipping the surface of the water. It is, however, generally

[1] The genus *Hirundo*, which embraces most of the swallows, has the bill short, triangular, broad at the base, depressed, cleft near to the eyes; upper mandible slightly hooked at the tip; nostrils basal, oblong, partly closed by a membrane, surmounted by feathers in front; legs short, with slender toes and claws; three toes before, the exterior united to the first joint of the middle one; one behind; wings long; the first quill the longest; tail of twelve feathers, mostly forked.

speaking, only the swallow that washes on the wing, by making many successive dips into a pond. Swallows will attend horsemen for miles, over wide downs, to collect such insects as are aroused by the trampling of the horses' feet.

THE PURPLE MARTEN[1]

Is a general inhabitant of the United States, and a particular favorite wherever he takes up his abode.

This bird, like the rest of his tribe, is migratory. His summer residence is universally among the habitations of man, who, having no interest in his destruction, is generally his friend and protector. Whenever he comes, he finds some hospitable retreat fitted up for his accommodation. Some people have large conveniences formed for the martens, with many apartments, which are fully tenanted, and occupied regularly every spring. Even the solitary Indian seems to have a particular respect for this bird. The Choctaws and Chickasaws cut off all the top branches of a sapling near their cabins, leaving the prongs a foot or two long, on each side of which they hang a gourd or calabash, hollowed out for their convenience. On the Mississippi the negroes stick up long canes, with the same species of apartment, in which the martens regularly breed. They begin their nest about the middle of April. It is formed of a quantity of willows, slender straws, feathers, and hay. When the female is sitting, she is frequently visited by the male, who occupies her place while she takes a short recreation abroad He sits on the outside of the apartment where she is, dressing and arranging his plumage, occasionally passing to the door, as if to inquire how she is. His notes at this time seem to have a peculiar softness, and his gratulations are expressive of much tenderness.

Conjugal fidelity seems to be faithfully preserved by these birds. A male and female marten once took possession of a box in Mr Bartram's garden. A day or two after, a second female made her appearance, but from the cold reception she met with, being frequently beat off by the male, she finally abandoned the place, and set off no doubt to seek a more sociable companion.

The flight of the purple marten unites in it all the swiftness, ease, rapidity of turning, and gracefulness of motion of its tribe. His usual note *peuo, peuo, peuo*, is loud and musical; but is frequently succeeded by others that

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[1] *Hirundo purpurea*, Lin.

are low and guttural. Wasps, bees, and large beetles, seem to be his favorite food. He is eight inches long, and of a rich deep purplish blue, except the wings and tail, which are brownish black.

THE BARN SWALLOW,[1]

Together with its whole tribe, are distinguished from the rest of small birds, by their sweeping rapidity of flight, their peculiar aerial evolutions of wing over our fields and rivers, and through our streets from morning to night. The light of heaven itself, the sky, the trees, or any other common objects of nature, are not better known than the swallows. The wonderful activity displayed by these birds, forms a striking contrast to the slow habits of other animals. Let a person take his stand on a summer evening by a field, meadow, or river shore, fix his eye on one of these birds, and follow for a while all its circuitous windings; its extensive sweeps; its sudden, rapidly reiterated zigzag excursions, little inferior to the lightning itself—and then attempt to calculate the length of the various lines it describes.

On the east side of the great range of the Alleghany, they are dispersed very generally over the country. Early in May they begin to build, and it takes nearly a week to complete the nest. It is in the form of an inverted cone, and placed up against a rafter in a barn. It is formed of mud, mixed with hay; it is then stuffed with fine hay, and a handful of downy geese feathers. It is not uncommon for twenty or thirty pair to build in the same barn, and some nests are within a few inches of each other; yet the most perfect harmony prevails in this peaceful and affectionate community. When the young are able to leave the nest, the old ones entice them out by fluttering backwards and forwards, twittering and calling to them constantly. As soon as they leave the barn, they are conducted to the trees and bushes, by the pond or river shore, where their proper food is abundant.

In August they all prepare for departure. They assemble on the roofs in great numbers, dressing and arranging their plumage, and making occa-

[1] *Hirundo Americana*, Wilson.

sional essays, twittering with great cheerfulness. Their song is a sprightly warble, sometimes continued for a considerable time. They then pass along to the south in great numbers; sometimes several hundreds pass within sight in a quarter of an hour. It is highly probable that they winter in Mexico and South America. They are easily tamed, and soon become gentle and familiar.

The barn swallow is seven inches long; the upper parts are steel blue; the front, chin, and under parts are chesnut; the wings and tail are black, the latter greatly forked.

THE BANK SWALLOW, OR SAND MARTEN[1]

Appears to be the most sociable with its kind, and the least intimate with man of all our swallows, living together in communities of three or four hundred. On the high sandy banks of a river, they scratch out holes for their nests, running them in a horizontal direction to the depth of two or three feet. At the extremity of this hole, a little fine dry grass, with a few large downy feathers, form the nest. The voice of this species is a low mutter. They are particularly fond of the shores of rivers; they likewise visit the seashore in great numbers, previous to their departure. It is the same species as the European.

The bank swallow is five inches long; the upper parts are mouse colored; the lower are white, with a band of brown across the upper part of the breast.

THE REPUBLICAN, OR CLIFF SWALLOW[2]

Is found in the western states. These birds build their nests in clusters, or associations, and defend them with spirit and pertinacity. They generally build on the sides of perpendicular cliffs, but sometimes under the eaves of houses. There are several others of the swallow tribe inhabiting the United States.

THE EUROPEAN MARTEN.[3]

This bird, "the temple-haunting martlet," as it is denominated by Shakspeare, is inferior in size to the swallow, and its tail is much less forked. The plumage, however, is nearly the same; the upper part of the body,

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[1] *Hirundo riparia* Lin. [2] *Hirundo fulva*, Bonap. [3] *Hirundo urbica*, Lin.

wings, and tail being black, glossed with purple; and the under parts white. They are much less agile than the chimney swallow, and have a placid, easy motion. These birds sometimes build against the sides of cliffs that overhang the sea; but more frequently under the eaves, in the corners of windows, or under cornices. The materials of the nest are earth, tempered and mixed with straw, and lined with small straws, grasses, and feathers. The little architect builds only during the morning, and allows the fabric to harden during the rest of the day. The same nest is often inhabited for several years.

THE SWIFT.[1]

This is the largest of the swallow kind known in England, being often eighteen inches long, though the entire weight of the bird is not more than one ounce. The whole plumage is of a sooty black, except the throat, which is white. The feet, which are so small that the actions of walking and rising from the ground seem very difficult, are of a particular structure, all the toes standing forward. For this reason, the swift never settles on the ground, unless by accident. They have, however, a strong grasp with their feet, which enables them to cling to walls. It spends more of its time on the wing than any other swallow, and its flight is more rapid. In summer it keeps on the wing at least sixteen hours out of the twenty-four. It breeds under the eaves of houses, in steeples, and other lofty buildings; and makes its nest of grass and feathers. It has but one brood in the summer, and never more than two young ones at a time.

The voice of the swift is a harsh scream; yet there are few ears to which it is not pleasing, from an agreeable association of ideas, since it is never heard but in the most lovely summer weather.

These birds visit England the latest, and retire the earliest, of all their tribes; as they withdraw from that country before the middle of August, generally by the tenth, and not a single straggler is to be seen by the twentieth. This early retreat is totally unaccountable, as that time is often the most delightful in the year. But, what is yet more extraordinary, they begin to retire still earlier in the most southerly parts of Andalusia; where they can by no means be influenced by any defect of heat, or even of food.

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[1] *Cypselus murarius*, Temm. The genus *Cypselus* has the bill very short, triangular, broad at the base, inconspicuous, depressed; gape as far as under the eyes; upper mandible hooked at the tip; nostrils cleft longitudinally, at the upper part of the bill, open, and the raised margins furnished with small feathers; legs very short, with the fore toes directed forwards, and quite divided; three toes, and claws short and thick; wings very long, tail with ten feathers.

THE CHIMNEY SWALLOW[1]

Is strongly distinguished from the other American swallows, by its figure, flight and manners. It is dispersed all over the country wherever there are vacant chimneys, that are convenient for their accommodation. In the western forests they build in the hollows of large trees. The nest is of singular construction, being formed of small twigs, fastened together by a sort of glue from two glands in the head. With this glue, which becomes hard, the nest is thickly besmeared. It is attached to the side of the wall, and is destitute of any soft lining. The young are fed at intervals during the night. The noise which the old ones make in passing up and down the funnel, has some resemblance to distant thunder. When there are long and heavy rains, the nest is sometimes precipitated to the bottom; but the young sometimes scramble up the chimneys, clinging like squirrels to the side. In this situation they are fed for a week or more.

This bird is four inches and a half in length, of a sooty brown color. When it flies, it utters the sounds *trip*, *trip*, *trip*, *tree*, *tree*, in a hurried manner When roosting, the thorny extremities with which its tail is furnished are thrown in for its support. It is never seen to alight but in hollow trees or chimneys; and is always most gay and active in wet and gloomy weather.

THE GOATSUCKER[2]

Is nearly allied to the swallow, both in form and manners. Like the swallow, it is remarkable for the wideness of its gape; like it, it feeds upon insects; like it, collects its food upon the wing; indeed, by some authors, it has been termed the nocturnal swallow, for it preys entirely in the night, or rather in the dusk of the evening, when the other swallows are retired to rest.

There is only one species known in Europe,[3] and this is considerably larger than the swallow, being ten inches and a half in length, and in weight two ounces and a half. The ground of the plumage is almost black, but it is beautifully diversified with ash color and white in different parts; and it

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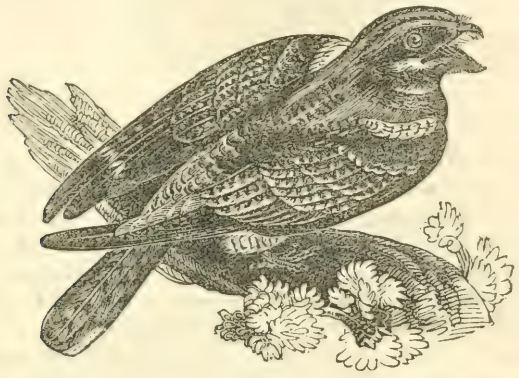
[1] *Cypselus pelasgicus*, Temm.

[2] The genus *Caprimulgus*, or goatsuckers, so named, from the erroneous notion that they sucked the teats of goats, has the bill slightly curved, very small, and depressed at the base; mouth extremely wide, nostrils basal, wide, closed by a membrane surmounted by feathers; tail round, or forked, of ten feathers; legs short, the anterior toes united to the first joint; middle claw long, and serrated on the edge, but smooth in some of the species; hind toe reversible.

[3] *Caprimulgus Europæus*, Lin.

has, like all the kind, a number of bristles about the bill. It makes no nest, but lays its eggs on the bare ground, or some loose crag, without any seeming care whatever. It is a great destroyer of cockchaffers and beetles; and its note resembles the noise of a spinning wheel. From its nocturnal habits, it has been called the night hawk, and the churn owl. It visits England about May, and returns in August. There appears to be no other ground for the ridiculous story of its sucking the goats, but the width of its mouth, which is to be accounted for on much more rational principles. "The country people (says Mr White) have a notion that the fern owl, or churn owl, or eve jar, which they call a puckeridge, is very injurious to weaning



calves, by inflicting, as it strikes at them, a fatal distemper, known to cowleeches by the name of puckeridge. Thus does this harmless, ill-fated bird, fall under a double imputation, which it by no means deserves — in Italy, of sucking the teats of goats, whence it is called caprimulgus, and with us, of communicating a deadly disorder to cattle. The least observation and attention would convince men that these birds neither injure the goatherd nor the grazier." Mr Waterton, also, has pointed out, that the "striking at the cattle," as the sapient rustics call it, is, in fact, the leap which the bird makes at the nocturnal flies which are tormenting the herd; and that, with more good sense than their masters possess, the cattle are aware of, and grateful for, the service which the bird thus renders to them.

THE NIGHT HAWK.[1]

This bird is called a bat in some of the southern states. It is by many supposed to be the same bird as the whip-poor-will; but on comparing the two birds, the difference between them will be easily observed, and their manners also are strikingly dissimilar. The night hawk lays its eggs on the bare ground, in an open space in the woods, or in the corner of a field, where the color of the leaves and ground may resemble the general tint of the eggs. The male and female are constantly near the nest during the day. They sit lengthwise on the branch of a tree, instead of crosswise, like most other birds, their legs and feet being too slender to grasp the branch firmly. While the female is sitting, the male keeps a most vigilant watch around. He plays about in the air, mounting by several quick vibrations of the wing, uttering all the while a sharp harsh squeal, till, having gained the highest point, he suddenly precipitates himself head foremost, and with great rapidity, down sixty or seventy feet, wheeling up as suddenly; at which instant is heard a booming sound, resembling that produced by blowing strongly into the bunghole of an empty hogshead; and which is doubtless produced by the sudden expansion of his capacious mouth, while he passes through the air. This singular habit belongs only to the male. The female never descends in the manner of the male. When she is approached, she moves in such a fluttering tumbling manner, and appearance of a lame and wounded bird, as nine times in ten to deceive the person, and induce him to pursue her. When the young are first hatched, it is difficult to distinguish them from the surface of the ground; they sit so fixed and squat as to be mistaken for a slight moulding on the earth.

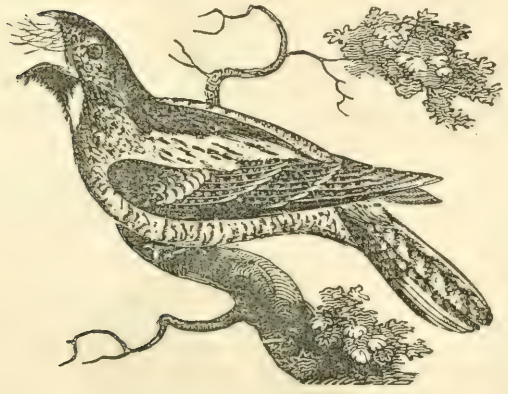
These birds are seen abroad at all times of the day; but their most favorite time is from two hours before sunset till dusk. They are very numerous

[1] *Caprimulgus Americanus*, Wilson

near salt marshes, skimming over the meadows in the manner of swallows. Their chief food seems to be insects. When wounded and taken, they attempt to intimidate you by opening their mouth to its utmost stretch, throwing the head forward, and uttering a kind of guttural whizzing sound, striking violently with their wings, which seem to be their only offensive weapons. In August they steer for the south in vast multitudes, darting after insects as they advance. They are often accompanied by twice their number of swallows.

The night hawk is nine inches and a half long; the upper parts are deep brown; the whole body is spotted and sanded with cream color and reddish. The tail is handsomely forked, and there are no bristles about the bill.

THE WHIP-POOR-WILL.[1]



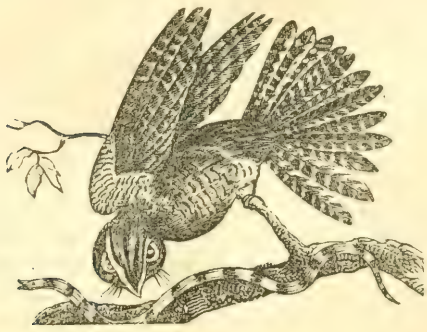
This is a very singular and celebrated species, universally known over the United States, for its favorite call in spring; yet, personally, he is little known. The notes of this solitary bird, seem like the voice of an old friend, and are listened to by almost all with great interest. At first they issue from some retired part of the woods, the glen, or mountain; in a few evenings, perhaps, we hear them from the adjoining coppice — the garden fence — the road before the door, and even from the roof of the dwelling-house, long after the family have retired to rest. He is now a regular acquaintance. Every morning and evening his shrill repetitions are heard

[1] *Caprimulgus vociferus*, Wilson.

from the adjoining woods, and when two or more are calling at the same time, the noise, mingling with the echoes of the mountains, is really surprising. These notes serve pretty plainly to articulate the words, whip-poor-will, the first and last syllables being uttered with great emphasis. When near, you often hear an introductory cluck between the notes. Towards midnight they generally become silent, unless in clear moonlight. During the day, they sit in the most retired, solitary, and deep shaded parts of the woods, where they repose in silence. Their food appears to be large moths, grasshoppers, and such insects as frequent the bark of old rotten and decaying timber.

The nest is built like that of the night hawk, on the ground; the young have very much the same appearance, though the eggs are much darker. When disturbed, the whip-poor-will rises and sails low and slowly, through the woods, for thirty or forty yards, and generally settles on a low branch or on the ground. Their favorite places of resort are on high and dry situations; in low marshy tracts of country they are seldom heard; in this they differ from the night hawk, which delights in extensive sea marshes. Their flight also is very dissimilar. The whip-poor-will has ranges of long and strong bristles on each side of the mouth; the night hawk is entirely destitute of them. The bill of the whip-poor-will is twice the length of that of the night hawk. The wings of the whip-poor-will are shorter by more than two inches than those of the night hawk. The tail of the latter is forked, that of the former is rounded. The two species differ also in size and color.

THE CHUCK WILL'S WIDOW.[1]



This solitary bird is rarely found north of Virginia and Tennessee. It has sometimes been confounded with the whip-poor-will. It has derived its

[1] *Caprimulgus Carolinensis*, Wilson.

name from its notes, which seem exactly to articulate those words. It commences its singular call generally in the evening, soon after sunset, and continues it with short occasional interruptions for several hours. Towards morning these repetitions are renewed. This note instantly attracts the attention of a stranger, and is strikingly different from that of the whip-poor-will. In sound and articulation it seems plainly to express the words which have been applied to it, pronouncing every syllable leisurely, and distinctly, putting the principal emphasis on the last word. In a still evening it may be heard at the distance of nearly a mile; the tones of its voice being stronger, and more full, than those of the whip-poor-will, who utters his with much greater rapidity.

The flight of this bird is slow, skimming about the surface of the ground, frequently settling on old logs, or on the fences, and from thence sweeping around in pursuit of various insects, that fly in the night. Like the whip-poor-will, it prefers the declivities of glens, and other deeply shaded places, making the mountains resound with echoes the whole evening.

ORDER IX.—COLUMBÆ.

Birds of this order have the bill of moderate dimensions, compressed; base of the upper mandible covered with a soft skin, in which the nostrils are perforated, the tip more or less curved; feet with three toes in front, quite divided, and one behind. This order contains but one genus, but is numerous in species, and these are very widely dispersed over the world.

THE AMERICAN WILD PIGEON,[1]

Called also the passenger pigeon, is the most remarkable of this whole order of birds. It is about the size of the common domestic pigeon. The head, throat, and upper parts of the body are ash colored; the sides of the neck are of a glossy variable purple; the fore part of the neck and breast are vinaceous; the under parts of a similar color, but paler; and there is a crimson mark round the eyes. These birds visit the different parts of North America, in such immense flocks, that we may justly apply to them Milton's expression of "numbers numberless." Their habits and migrations, and the manner in which they are pursued by man and beast, are thus described by Mr Audubon. "The most important facts connected with the habits of these birds, relate to their extraordinary associations and migrations. No

[1] *Columba migratoria*, Lin. The characteristics of the genus *Columba*, are, bill of medium size, straight, compressed, arched, tip curved; base of the upper mandible covered with a soft skin, more or less inflated; nostrils in the middle of the membrane; legs generally red; three toes before, entirely divided, one behind, articulated on the heel; wings with the second quill feather longest.

other species known to naturalists, is more calculated to attract the attention of either the citizen or the stranger, as he has opportunity of viewing both of these characteristic habits, while they are passing from north to south, east and west, and, *vice versa*, over and across the whole extent of the United States of America.

"The remarkable migrations are owing entirely to the dire necessity of providing food, and not merely to escape the severity of a northern latitude, or seek a southern one for the purpose of breeding. They, consequently, do not take place at any fixed period or season of the year. Indeed it happens sometimes that a continuance of a sufficient supply of food in one district will keep these birds absent from another for years.

"I know, at least, to a certainty, that in Kentucky they remained for several years constantly, and were no where else to be found. They all disappeared one season suddenly when the mast was exhausted, and thus did not return for a long period. The same facts have been observed in other states.

"Their great power of flight enables them, when in need, to survey and pass over an astonishing extent of country in a very short time. This is proved by facts known to the greater number of observers in America. Pigeons, for example, have been killed in the neighborhood of New York, with their crops still filled with rice, collected by them in the fields of Georgia and Carolina, the nearest point at which this supply could possibly have been obtained; and, as it is well ascertained, that owing to their great power of digestion, they will decompose food entirely in twelve hours, they must

nave travelled between three and four hundred miles in six hours, making their speed at an average about one mile in a minute, and this would enable one of these birds, if so inclined, to visit the European continent, as swallows are undoubtedly able to do, in a couple of days.

"This great power of flight is seconded by as great a power of vision, which enables them, as they travel at that swift rate, to view objects below, to discover their food with facility, and thus put an immediate end to their journey. This I also have proved to be the case, by having observed the pigeons, when passing over a destitute part of the country, keep high in air, and in such an extensive front, as to enable them to survey hundreds of acres at once. But if, on the contrary, the land is richly covered with food, or the trees with mast, they will fly low, in order to discover the portion most plentifully supplied, and upon these they alight progressively.

"The form of the bodies of these swift travellers is an elongated oval, steered by a long well-plumed tail, furnished with extremely well set and very muscular wings for the size of the individual. If a single bird is seen gliding through the woods and close by, it passes apparently like a thought; and on trying to see him again, the eye searches in vain — the bird is gone!

"Their multitudes in our woods are astonishing; and, indeed, after having viewed them so often, and under so many circumstances, for years, and, I may add, in many different climates, I even now feel inclined to pause, and assure myself afresh that what I am going to relate is fact. That I have seen it is most certain; and I have seen it all in the company of hundreds of other persons looking on, like myself, amazed, and wondering if what we saw was really true.

"In the autumn of 1813, I left my house at Henderson, on the banks of the Ohio, on my way to Louisville. Having met the pigeons flying from north-east to south-west, in the barrens of natural wastes, a few miles beyond Hardensburgh, in greater apparent numbers than I thought I had ever seen them before, I felt an inclination to enumerate the flocks that would pass within the reach of my eye in one hour. I dismounted, and, seating myself on a tolerable eminence, took my pencil to mark down what I saw going by and over me, and made a dot for every flock which passed.

"Finding, however, that it was next to impossible, and feeling unable to record the flocks, as they multiplied constantly, I rose, and, counting the dots then put down, discovered that one hundred and sixty-three had been made in twenty-one minutes. I travelled on, and still met more the farther I went. The air was literally filled with pigeons; the light of noonday became dim, as during an eclipse; the pigeon's dung fell in spots, not unlike melting flakes of snow; and the continued buzz of their wings over me had a tendency to incline my senses to repose.

"Whilst waiting for my dinner at Young's inn, at the confluence of Salt river with the Ohio, I saw, at my leisure, immense legions still going by, with a front reaching far beyond the Ohio on the west, and the beech-wood

forests directly on the east of me. Yet not a single bird would alight; for not a nut or acorn was that year to be seen in the neighborhood. They consequently flew so high, that different trials to reach them with a capital rifle proved ineffectual, and not even the report disturbed them in the least. But I cannot describe how beautiful their aerial evolutions were, if a black hawk appeared in their rear. At once, like a torrent, and with a thunder-like noise, they formed themselves into almost a solid compact mass, pressing each on each towards the centre; and when, in such solid bodies, they zigzagged to escape the murderous falcon, now down close over the earth sweeping with inconceivable velocity, then ascending perpendicularly, like a vast monument; and, when high, were seen wheeling and twisting within their continued lines, resembling the coils of a gigantic serpent.

"Before sunset I reached Louisville, distant from Hardenburgh fifty-five miles, where the pigeons were still passing, and this continued for three days in succession.

"The people were indeed all up in arms, and shouting on all sides at the passing flocks. The banks of the river were crowned with men and children, for here the pigeons flew rather low as they passed the Ohio. This gave a fair opportunity to destroy them in great numbers. For a week or more, the population spoke of nothing but pigeons, and fed on no other flesh but that of pigeons. The whole atmosphere during this time was strongly impregnated with the smell appertaining to their species.

"It is extremely curious to see flocks after flocks follow exactly the very evolutions performed by a preceding one, when they arrive at the place where these manœuvres were displayed. If a hawk, for instance, has chanced to charge on a portion at a certain spot, no matter what the zigzags, curved lines, or undulations of lines might have been during the affray, all the following birds always keep the same track; so that if the traveller happens to see one of those attacks, and feels a wish to have it repeated, he may do so by waiting for a short time.

"It may not, perhaps, be out of place to attempt an estimate of the number of pigeons contained in those mighty flocks, and the quantity of food consumed by its members. The inquiry will show the astonishing bounty of the Creator in his works, and how universally this bounty has been granted to every living thing on the vast continent of America.

"We shall take, for example, a column of one mile in breadth, which is far below the average size, and suppose it passing over us without interruption for three hours, at the rate mentioned above, of one mile per minute. This will give us a parallelogram of one hundred and eighty miles by one, covering one hundred and eighty square miles, and allowing two pigeons to the square yard, we have one billion one hundred and fifteen million one hundred and thirty-six thousand pigeons in one flock; and as every pigeon consumes fully half a pint of food per day, the quantity must be eight million seven hundred and twelve thousand bushels per day, which is required to feed such a flock

"As soon as these birds discover a sufficiency of food to entice them to alight, they fly round in circles, reviewing the country below, and at this time exhibit their phalanx in all the beauties of their plumage; now displaying a large glistening sheet of bright azure, by exposing their backs to view, and suddenly veering, exhibit a mass of rich deep purple. They then pass lower, over the woods, and are lost among the foliage for a moment, but they reappear as suddenly above; after which they alight, and, as if affrighted, the whole again take to wing, with a roar equal to loud thunder, and wander swiftly through the forest to see if danger is near. Impelling hunger, however, soon brings them all to the ground, and then they are seen industriously throwing up the fallen leaves to seek for the last beech-nut or acorn; the rear ranks continually rising, passing over, and alighting in front, in such quick succession, that the whole still bears the appearance of being on the wing. The quantity of ground thus swept up, or, to use a French expression, *moissonnée*, is astonishing, and so clean is this work, that gleaners never find it worth their while to follow where the pigeons have been. On such occasions, when the woods are thus filled with them, they are killed in immense numbers, yet without any apparent diminution. During the middle of the day, after their repast is finished, the whole settle on the trees to enjoy rest, and digest their food; but as the sun sinks in the horizon, they depart *en masse* for the roosting place, not unfrequently hundreds of miles off, as has been ascertained by persons keeping account of their arrival and of their departure from their curious roosting places, to which I must now conduct the reader.

"To one of those general nightly rendezvous, not far from the banks of Green River, in Kentucky, I paid repeated visits. It was, as is almost always the case, pitched in a portion of the forest where the trees were of great magnitude of growth, but with little underwood. I rode through it lengthwise upwards of forty miles, and crossed it in different parts, ascertaining its average width to be rather more than three miles. My first view of it was about a fortnight subsequent to the period when they had chosen this spot, and I arrived there nearly two hours before the setting of the sun. Few pigeons were then to be seen, but a great number of persons, with horses and wagons, guns and ammunition, had already established different camps on the borders. Two farmers from the vicinity of Russelsville, distant more than a hundred miles, had driven upwards of three hundred hogs to be fattened on pigeon-meat, and here and there the people, employed in picking and salting what had already been procured, were seen sitting in the centre of large piles of these birds, all proving to me that the number resorting there at night must be immense, and probably consisting of all those then feeding in Indiana, some distance beyond Jeffersonville, not less than one hundred and fifty miles off. The dung of the birds was several inches deep, covering the whole extent of the roosting place like a bed of snow. Many

trees, two feet in diameter, I observed, were broken at no great distance from the ground, and the branches of many of the largest and tallest so much so, that the desolations already exhibited, equalled that performed by a furious tornado. As the time elapsed, I saw each of the anxious persons about to prepare for action; some with sulphur in iron pots, others with torches of pine knots, many with poles, and the rest with guns, double and treble charged. The sun was lost to our view, and not a pigeon had yet arrived; but, all of a sudden, I heard a general cry of '*Here they come!*' The noise which they made, though distant, reminded me of a hard gale at sea, passing through the rigging of a close-reefed vessel. As the birds arrived, and passed over me, I felt a current of air that surprised me. Thousands were soon knocked down by the polemen. The current of birds, however, kept increasing. The fires were lighted, and a most magnificent as well as wonderful and terrifying sight was before me. The pigeons, coming in by millions, alighted every where, one on the top of another, until masses of them, resembling hanging swarms of bees as large as hogsheads, were formed on every tree in all directions. These heavy clusters were seen to give way, as the supporting branches, breaking down with a crash, came to the ground, killing hundreds of those which obstructed their fall, forcing down other equally large and heavy groups, and rendering the whole a scene of uproar and of distressing confusion. I found it quite useless to speak, or even to shout to those persons nearest me. The reports even of the different guns were seldom heard, and I knew only of their going off by seeing the owners reload them.

"No person dared venture within the line of devastation, and the hogs had been penned up in due time, the picking of the dead and wounded sufferers being left for the next morning's operation. Still the pigeons were constantly coming, and it was past midnight before I perceived a decrease in the number of those that arrived. The uproar continued, however, the whole night; and, as I was anxious to know to what distance the sound reached, I sent off a man, who, by his habits in the woods, was able to tell me, two hours afterwards, that at three miles he heard it distinctly. Towards the approach of day, the noise rather subsided; but, long ere the objects were all distinguishable, the pigeons began to move off in a direction quite different from that in which they had arrived the day before, and at sunrise, none that were able to fly remained. The howling of the wolves now reached our ears, and the foxes, the lynxes, the cougars, bears, racoons, opossums, and polecats, were seen sneaking off the spot, whilst the eagles and hawks of different species, supported by a horde of buzzards and carrion crows, came to supplant them, and reap the benefits of this night of destruction.

"It was then that I, and all those present, began our entry amongst the dead and wounded sufferers. They were picked up in great numbers, until

each had as many as could possibly be disposed of; and afterwards the hogs and dogs were let loose to feed on the remainder.

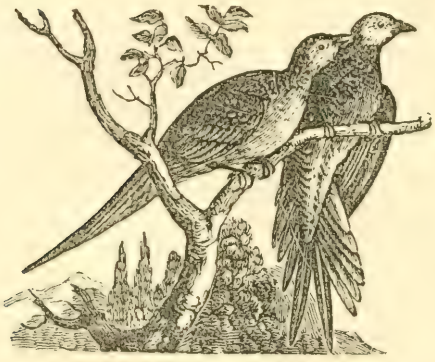
"Persons unacquainted with these birds must naturally conclude, that such dreadful havoc must soon put an end to the species; but this is very far from being the case, for by long observation I have satisfied myself, that, as they not unfrequently quadruple their numbers yearly, always, at least, double it, nothing but the gradual diminution of our forests can accomplish their decrease. In 1805, I have seen schooners loaded in bulk with pigeons caught up the Hudson River, coming into the wharf at New York, and those birds sold for a cent a piece. I knew a man in Pennsylvania, who caught and killed upwards of five hundred dozen in a clap-net in a day, sweeping sometimes twenty dozen or more at one haul.

"I have also seen the negroes at the United States' Salines, or salt-works, of Shawnee Town, wearied with killing pigeons, as they alighted to drink water issuing from the leading pipes, for weeks at times; and yet, in 1826, in Louisiana, I saw congregated flocks of those birds as numerous as ever I had seen them before, during a residence of nearly thirty years in the United States.

"The breeding of the wild pigeons, and the places chosen for that purpose, are points of great interest. As I have said before, the time set apart for this is not influenced by climate or season, but generally takes place where and when food is most plentiful and most attainable, and always at a convenient distance from the water, and in high timbered forests. The spot generally chosen is not, like that above described, a scene of confusion and death, but one where, it is no exaggeration to say, the tenderest affection seems to prevail. To this place these countless myriads of pigeons fly and settle to coo, and, with parental care, begin their nests in general peace and harmony. On the same tree, from fifty to one hundred nests may be seen, formed of slight materials, being only composed of a few dried twigs, crossed in different ways, supported by suitable forks in the branches from the lowest to the highest, and each mate partakes in the task of incubation. The females lay two white eggs each, proportioned to the size of the bird, and, as they sit the greater portion of this precious time, the males feed them from bill to bill, with amorous tenderness and care.

"The young are hatched, and would grow and leave the nest in course of time, did not man discover the place, and commence his work of devastation. Armed with axes, their enemies reach the spot, to seize and destroy all they can. The trees are felled, and are made to fall in such a way, that the cutting of one causes the fall of one or two more, or shakes others in such a manner, that the squabs, or young pigeons, are violently hurried to the ground."

THE CAROLINA PIGEON,[1]



Called also the turtle-dove, is a general inhabitant, in the summer, of the United States, from Canada to Florida, and from the seacoast to the Mississippi, and far to the westward. They pass the winter in great numbers at North and South Carolina. It is a favorite bird with all those who love to wander among the woods in spring, and listen to their varied harmony They will hear many a singular and striking performance, but none so mournful as this. Its notes are four; the first is somewhat the highest and preparatory, seeming to be uttered with an inspiration of the breath, as if the afflicted creature were just recovering its voice from the last convulsive notes of distress; this is followed by three long, deep, and mournful moanings, that no one can listen to without sympathy. A pause of a few minutes ensues, and then again the solemn voice of sorrow is renewed as before.

There is, however, nothing of real distress in all this; quite the reverse. The bird who utters it, wantons by the side of his beloved partner, or invites her, by his call, to some favorite, retired, and shady retreat. It is the voice of love, of faithful connubial affection, for which the whole family of doves are so celebrated; and among them all, none more deservedly so, than the species now before us. The flight of this bird is quick, vigorous, and always accompanied by a peculiar whistling of the wings. They fly with great swiftness, alight on trees, fences, or on the ground, indiscriminately; are exceedingly fond of buck-wheat, hemp-seed, and Indian corn; feed on several kinds of berries and small acorns. They devour large quantities of gravel, and have a great regard for peas.

The nest is very rudely constructed, generally in an evergreen, among the thick foliage of a vine, in an orchard on an apple tree, and sometimes on the

[1] *Columba Carolinensis*, Lin.

ground. It is composed of trees and roots, making an almost flat nest. The flesh of this bird is considered superior to that of the wild pigeon. It is twelve inches long; it has a beautiful glossy black eye. The general color is a fine slate blue, reflecting in some part the most vivid tints of green, gold, and crimson. The legs and feet are red, seamed with white.

THE GROUND DOVE[1]

Is one of the least of the pigeon tribe, and has a very timid and innocent appearance. It is a native of North and South Carolina, Louisiana, Florida, and the West Indies. They are numerous on the seacoasts of Carolina and Georgia, fly in flocks of fifteen or twenty, seldom visit the woods, and are almost constantly on the ground. They feed on rice, seeds, and berries. It is six inches and a quarter long. The upper parts are of a cinereous brown; the throat and breast of a pale purple; the iris of the eye orange red, and the legs and feet yellow.

In the United States are found, also, the white-crowned pigeon, the band-tailed pigeon, and the zenaida dove.

THE DOMESTIC PIGEON,

With all its beautiful varieties, is said to derive its origin from the stock-dove,[2] the English name, implying its being the stock, or stem, whence the other domestic kinds have been propagated. This bird, in its natural state, is of a deep bluish ash color; the breast dashed with a fine changeable green and purple; its wings marked with two black bars; and the tail barred near the end with black. These are the colors of the pigeon in a state of nature; and from these simple tints, has man, by art, propagated a variety, that words cannot describe, nor even fancy suggest. However, nature still perseveres in her great outline; and though the form, color, and even the fecundity of these birds may be altered by art, yet their natural manners and inclinations continue still the same. The stockdove usually builds in holes of rocks, or in excavated trees. Its murmuring note at morning, and dusk, is highly pleasing.

The dovehouse pigeon, as is well known, breeds every month; it lays two white eggs, which, most usually, produce young ones of different sexes. From three or four o'clock in the evening, till nine the next day, the female sits on the eggs; she is then relieved by the male, who takes his place from ten till three, while his mate is feeding abroad. In this manner they sit

[1] *Columba passerina*, Wilson.

[2] *Columba œnas*, Lin.

alternately till the young are excluded, which is from eighteen to twenty days, according to the warmth of the season. If, during this term, the female delays to return at the expected hour, the male follows, and drives her to the nest; and should he in his turn be dilatory, she retaliates with equal severity.

The hen pigeon is, however, so constant to her eggs, that one, whose legs were frozen and dropped off, continued to sit, notwithstanding the pain which she endured with the loss of her limbs, till her young were hatched. Her legs were frozen by the nest being too near the entrance of the dovecote, and consequently exposed to the cold air.

The young ones, when hatched, require no food for the three first days, only wanting to be kept warm, which is an employment the female takes entirely upon herself. During this period she never stirs out, except for a few minutes, to take a little food. From this they are fed for eight or ten days, with corn, or grain, of different kinds, which the old ones gather in the fields, and keep treasured up in their crops, whence they throw it up again into the mouths of their young ones, who very greedily demand it. So great is the produce of this bird in its domestic state, that near fifteen thousand may, in the space of four years, be produced from a single pair.

Most birds drink by sipping at intervals; the pigeon takes a long continued draught, like a quadruped.

Those pigeons which are called carriers, and are used to convey letters, are easily distinguished from all others, by their eyes, which are compassed about with a broad circle of naked white skin, and by being of a dark blue or blackish color. It is from their attachment to their native place, and particularly where they have brought up their young, that these birds are employed in several countries as the most expeditious carriers. They are first brought from the place where they were bred, and whither it is intended to send them back with information. The letter is tied under the bird's wing, and, after feeding it well, lest it should stop by the way to eat, it is let loose to return. The little animal no sooner finds itself at liberty, than its passion for its native spot directs all its motions. It is seen, upon these occasions, flying directly into the clouds to an amazing height; and then, with the greatest certainty and exactness, directing itself by some surprising instinct towards home, which lies sometimes at many miles distance. It is said, that, in the space of an hour and a half, they sometimes perform a journey of forty miles.

The varieties of the tame pigeon are so numerous, that it would be a vain attempt to mention them all.

ORDER X.—GALLINÆ.

Birds of this order have the bill short, convex, in some genera covered by a cere; upper mandible bending from its base, or only at the point; nostrils lateral, covered by a membrane, naked or feathered; tarsus long, three toes before, united at their base by a membrane; hind toe articulated on the tarsus above the junction of the anterior toes.

THE PEACOCK[1]

Came originally from the East Indies; and we are assured that tney are still found in vast flocks, in a wild state, in the islands of Java and Ceylon.

[1] *Pavo cristatus*, Lin. The genus *Pavo* has the bill naked at the base, convex above, thickened, bent down towards the tip; nostrils open; cheeks partially denuded; tail coverts very long; tail of eighteen feathers, elongated, broad, capable of being expanded like a fan, and ocellated; tarsus longer than the middle toe, with a conical spur; head crested.

To describe, in adequate terms, the dazzling beauties of this elegant bird would be a task of no small difficulty. Its head is adorned with a tuft, consisting of twenty-four feathers, whose slender shafts are furnished with webs only at the ends, painted with the most exquisite green, mixed with gold; the head, throat, neck, and breast, are of a deep blue, glossed with green and gold; the greater coverts and bastard wings are of a reddish brown, as are also the quills, some of which are variegated with black and green; the belly and vent are black, with a greenish hue: but the distinguishing character of this singular bird is its train, which rises just above the tail, and, when erected, forms a fan of the most resplendent hues; the two middle feathers are sometimes four feet and a half long, the others gradually diminishing on each side; the shafts, white, and furnished from their origin nearly to the end with parted filaments of varying colors, ending in a flat vane, which is decorated with what is called the eye. The real tail consists of short, stiff, brown feathers, which serve as a support to the train. When pleased or delighted, and in sight of his females, the peacock erects his train, and displays all the majesty of his beauty: all his movements are full of dignity; his head and neck bend nobly back; his pace is slow and solemn, and he frequently turns slowly and gracefully round, as if to catch the sunbeams in every direction, and produce new colors of inconceivable richness and beauty, accompanied at the same time with a hollow murmuring voice expressive of desire. The cry of the peacock, at other times, is often repeated, and very disagreeable. The plumes are shed every year, and, while moulting them, the bird, as if humiliated, retires from view.

The peacock has, in some countries, been esteemed as an article of luxury; but whatever there may be of delicacy in the flesh of a young peacock, it is certain an old one is very indifferent eating. Its fame for delicacy, however, did not continue very long; for we find, in the time of Francis the First, that it was a custom to serve up peacocks to the tables of the great, with an intention not to be eaten, but only to be seen. Their manner was to strip off the skin; and then preparing the body with the warmest spices, they covered it up again in its former skin, with all its plumage in full display, and no way injured by the preparation. The bird, thus prepared, was often preserved for many years without corrupting; and it is asserted of the peacock's flesh, that it keeps longer unputrefied than that of any other animal. To give a higher zest to these entertainments, on weddings particularly, they filled the bird's beak and throat with cotton and camphor, which they set on fire to amuse and delight the company. Peacocks were highly esteemed by the Romans, and the Bible mentions them among Solomon's importations from the East. In the days of chivalry, also, they were in such great repute as to be the subject of a knightly oath.

Like other birds of the poultry kind, the peacock feeds upon corn; but its chief predilection is for barley. There is, however, scarcely any food that it will not at times covet and pursue. In the indulgence of these capricious

pursuits, walls cannot easily confine it; it strips the tops of houses of their tiles or thatch, it lays waste the labors of the gardener, roots up his choicest seeds, and nips his favorite flowers in the bud. Thus its beauty ill recompenses for the mischief it occasions; and many of the more homely looking fowls are very deservedly preferred before it.

The peahen seldom lays above five or six eggs in this climate before she sits. Aristotle describes her as laying twelve; and it is probable, in her native climate, she may be thus prolific: for it is certain, that, in the forests where they breed naturally, they are numerous beyond expression. The bird lives about twenty years; and not till its third year has it that beautiful variegated plumage that adorns its tail.

THE DOMESTIC COCK.[1]

Of all birds, the cock seems to be the oldest companion of mankind, to have been first reclaimed from the forest, and taken to supply the accidental failure of the luxuries or necessaries of life. As he is thus longest under the care of man, so perhaps he exhibits the greatest number of varieties, there being scarcely two birds of this species that exactly resemble each other in plumage and form.

It is not well ascertained when the cock was first made domestic in Europe; but it is generally agreed that it was first brought there from the kingdom of Persia. It came to America with the early European settlers. The cock is found wild in the island of Tinian, in many others of the Indian ocean, and in the woods on the coasts of Malabar; his plumage is black and yellow, and his comb and wattles are yellow and purple. There is another peculiarity also in those of the Indian woods; their bones, which, when

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[1] *Gallus domesticus*, Temm. This genus has the bill of medium size, strong, base naked; upper mandible arched, convex, bent towards the point; head surmounted by a crest or plume; ears naked; three toes before, united to the first joint; the hind toe raised from the ground; tarsus with a long and bent spur; middle feathers of the tail arched; wings short.

boiled with us, are white, as every body knows, in those are black as ebony. Whether this tincture proceeds from their food, as the bones are tinctured red by feeding upon madder, we leave to the discussion of others: satisfied with the fact, let us decline speculation.

In their first propagation in Europe, there were distinctions then that now subsist no longer. The ancients esteemed those fowls whose plumage was reddish, as invaluable; but as for the white, it was considered as utterly unfit for domestic purposes. These they regarded as subject to become a prey to rapacious birds; and less fruitful than the former. No animal in the world has greater courage than the cock, when opposed to one of his own species and in every part of the world, where refinement and polished manners have not entirely taken place, cock-fighting is a principal diversion. In China, India, the Philippine islands, and all over the East, cock-fighting is the sport and amusement even of kings and princes. In England it is declining every day; and it is to be hoped it will, in time, become only the pastime of the lowest vulgar. It is the opinion of many persons there, that they have a bolder and more valiant breed than is to be found elsewhere; but the truth is, they have cocks in China as bold, if not bolder than the English cocks. Nor is it against his own species alone that the cock displays courage. One, of less than a year old, has been known to dart on a sparrowhawk, throw him down, and detain him till a person came to secure the plunderer.

To his females the cock is assiduously attentive. He keeps them always in his sight, prevents them from straggling, and defends them from aggression. Whatever strange cock appears within his bounds is instantly attacked. His jealousy is as strong as his gallantry, and has been said to prompt him to take vengeance on the female. Dr Percival relates an instance, in which some patridges' eggs having been hatched under a hen, the cock, as soon as he saw the brood, fell furiously upon the unfortunate foster-mother, and killed her before any help could be afforded to her.

The hen seldom clutches a brood of chickens above once a season, though instances have been known in which they have produced two. The number of eggs a domestic hen will lay in the year is above two hundred, provided she be well fed, and supplied with water and liberty. It matters not much whether she be trodden by the cock or not; she will continue to lay, although all the eggs of this kind can never by hatching be brought to produce a living animal.

As soon as an egg is laid, it begins to transpire, and loses, in a little time, some grains of its weight. If it continues exposed to the air, the inside hardens, and contracts a bad flavor; but, to prevent this effect, it is only necessary to cover the outside of the shell with a varnish, or with oily matter, which shields it from the air. It is obvious, however, that the varnish must be removed if the eggs are designed for hatching.

The hen makes her nest without any care, if left to herself; a hole scratched in the ground, among a few bushes, is the only preparation she

makes for this season of patient expectation. Nature, almost exhausted by its own fecundity, seems to inform her of the proper time for hatching, which she herself testifies by a clucking note, and by discontinuing to lay. If left entirely to herself, the hen would seldom lay above twenty eggs in the same nest, without attempting to hatch them. While she sits, she carefully turns her eggs, and even removes them to different situations; till at length, in about three weeks, the young brood begin to give signs of a desire to burst their confinement.

The formation of the embryo is curious. During the first day's incubation, and even when the egg has been under the hen a few hours, the head of the chicken may be seen gradually uniting itself to the spine of the back. On the second day the first process of the vertebræ may be discerned, like so many small globules disposed on each side of the spine. The first commencement of the wings and the umbilical vessels may also be distinguished by their dark color. The neck and breast also show themselves, and the head continues to increase in size. The third day, the whole is more distinct and enlarged; and the heart, which is suspended at the opening of the breast, is observed to beat; veins and arteries may also be perceived about the brains, and the spinal marrow begins to extend itself through the spine. The eyes are considerably formed on the fourth day. The pupil and the crystalline and vitreous humors may be distinctly seen. The wings increase, the thighs appear, and the whole body begins in some degree to be covered with flesh. The fifth day, the body is covered with a glutinous, or unctuous flesh, the heart is retained within a very fine membrane, which also extends itself all over the breast. The sixth day, the spinal marrow, in two divisions, continues to advance along the trunk; the liver, which at first was whitish, becomes of a darker hue; both ventricles of the heart beat, and the body of the chicken is covered with skin, in which may be already discerned the points of the feathers. The beak may be discovered on the seventh day, and the brain, the wings, the thighs and even the feet, have acquired a perfect form. The lungs appear at the end of the ninth day; their color is whitish. On the tenth, the muscles of the wings begin to form, the feathers continue to shoot out. It is not till the eleventh day that the arteries, which before were separate, unite to the heart. The rest of the process consists only in an increase and more perfect development of the several parts, till they acquire sufficient vigor to break the shell.

The strongest and best chickens generally are the first candidates for liberty; the weakest come behind, and some even die in the shell. When all are produced, the hen leads them forth to provide for themselves. Her affection and her pride seem then to alter her very nature, and correct her imperfections. No longer voracious or cowardly, she abstains from all food that her young can swallow, and flies boldly at every creature that she thinks is likely to do them mischief.

Ten or twelve chickens are the greatest number that a good hen can rear

and clutch at a time; but as this bears no proportion to the number of her eggs, schemes have been imagined to clutch all the eggs of an hen, and thus turn her produce to the greatest advantage. The contrivance we mean is the artificial method of hatching chickens in stoves, as is practised at Grand Cairo; or in a chemical laboratory, properly graduated, as has been effected by Mr Reaumur. At Grand Cairo, they thus produce six or seven thousand chickens at a time; where, as they are brought forth in their mild spring, which is warmer than our summer, the young ones thrive without clutching. But it is otherwise in our colder and unequal climate; the little animals may, without much difficulty, be hatched from the shell; but they almost all perish when excluded. Recent attempts have been made to apply steam to the purpose of hatching fowls. The cock is a short-lived animal; but how long these birds live, if left to themselves, is not yet well ascertained by any historian.

THE PHEASANT.[1]

The *pheasant* is the bird of *Phasis*, a river of Colchis, in Asia Minor whence they were first introduced into Europe.

Next to the peacock they are the most beautiful of birds, as well for the vivid color of their plumes as for their happy mixtures and varieties. It is far beyond the power of the pencil to draw any thing so glossy, so bright, or points so finely blending into each other. We are told that when Crœsus, king of Lydia, was seated on his throne, adorned with royal magnificence, and all the barbarous pomp of eastern splendor, he asked Solon if he had ever beheld any thing so fine? The Greek philosopher, no way moved by the objects before him, or taking a pride in his native simplicity, replied, that after having seen the beautiful plumage of the pheasant, he could be astonished at no other finery.

In fact, nothing can satisfy the eye with a greater variety and richness of ornament than this beautiful creature. The iris of the eyes is yellow; and the eyes themselves are surrounded with a scarlet color, sprinkled with small specks of black. On the fore part of the head there are blackish feathers mixed with a shining purple. The top of the head and the upper part of the neck are tinged with a darkish green that shines like silk. In some, the top of the head is a shining blue, and the head itself, as well as the upper part of the neck, appears sometimes blue and sometimes green, as it is diffe-

[1] *Phasianus Colchicus*, Lin. The genus *Phasianus* has the bill short, thickened, naked at the base; bent towards the tip; nostrils basal, lateral; cheeks naked, warty; ears covered; three toes before, united to the first joint, and one behind; tarsi furnished with spurs in the males; tail elongated cuneiform, and composed of eighteen feathers; wings short.

rently placed to the eye of the spectator. The feathers of the breast, the shoulders, the middle of the back, and the sides under the wings, have a blackish ground, with edges tinged of an exquisite color, which appears sometimes black and sometimes purple, according to the different lights it is placed in; under the purple there is a transverse streak of gold color. The tail, from the middle feathers to the root, is about eighteen inches long; the legs, the feet, and the toes are of the color of horn. There are black spurs on the legs, shorter than those of a cock; there is a membrane that connects two of the toes together; and the male is much more beautiful than the female.

The wings of the pheasant are short, and not calculated for a protracted flight. On this account, the pheasants on the island called Isola Madre, in the Lago Maggiore, in Italy, as they cannot fly across the lake, are imprisoned. Those which attempt to cross are almost always drowned.

This bird, though so beautiful to the eye, is not less delicate when served up to the table. Its flesh is considered as the greatest dainty; and when the old physicians spoke of the wholesomeness of any viands, they made their comparison with the flesh of the pheasant. In the woods the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state she seldom lays above ten. Its fecundity when wild is sufficient to stock the forest; its beautiful plumage adorns it; and its flesh retains a higher flavor from its unlimited freedom.

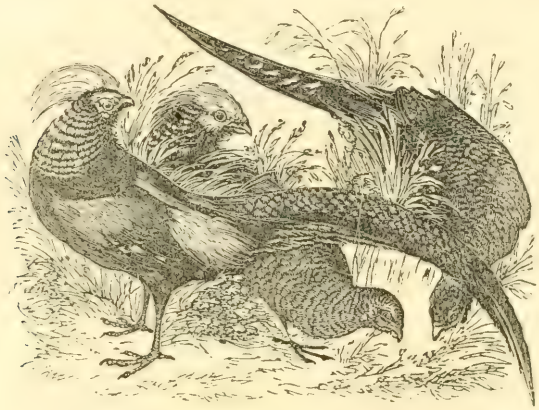
The pheasant, when full grown, seems to feed indifferently upon every thing that offers. It is said by a French writer, that one of the king's sportsmen shooting at a parcel of crows that were gathered round a dead carcass, to his great surprise, upon coming up, found that he had killed as many pheasants as crows. It is even asserted by some, that such is the carnivorous disposition of this bird, that when several of them are put together in the same yard, if one of them happens to fall sick, or seems to be pining, all the rest will fall upon, kill, and devour it.

THE GOLDEN PHEASANT.[1]

Of all the species of pheasants which are met with in our preserves and in our aviaries, the golden pheasant is the rarest and the most beautiful. The male bird, when in perfect plumage, measures nearly three feet in length, of which the tail alone forms about two thirds. The feathers of the fore part of the head are very long, silky, and of a bright yellow; and considerably overhang those of the hinder part, which are of a brilliant orange, marked with transverse black rays. These last are elongated and extended

[1] *Phasianus pictus*, Lin.

backwards over the sides of the neck, and may be raised or depressed at will. A few minute hairs are scattered over the cheeks, which are of a livid complexion. The feathers of the back of the neck are tinged with a mixture of green and gold and bordered with black, those of the back and the upper tail-coverts are bright yellow, the latter terminating in a crimson border.



These magnificent birds are natives of China; and it was warmly maintained by Buffon, in accordance with his theory of the degeneration of animals, that they were merely a variety of the common pheasant, which has assumed a more splendid plumage, in consequence of the superior fineness of the climate in which they dwelt. Unfortunately for this hypothesis, the common pheasant is also widely spread throughout the same region, in which it preserves all the characters by which it is distinguished in Europe, and never produces in its wild state a mixed breed with its supposed variety. No naturalist since Buffon has imagined such a transformation possible.

THE WILD TURKEY.[1]

This elegant bird is the original stock from which all the common domestic turkeys have been produced. It is a native of America, and is found in all the western parts of the United States and North America, from Lake Superior to the Isthmus of Panama. They abound in the forests and un-

[1] *Meleagris gallopavo*, Lin. The genus *Meleagris* has the bill short and thick, base covered with a naked skin; head and upper part of the neck invested with a naked, tuberculated skin; a loose caruncle on the upper part of the bill; throat with a longitudinal pendulous, and caruncled wattle; tarsi of the male with an obtuse and weak spur; wings short; tail of eighteen feathers spreading into a circle.

settled parts of the Union, but are not numerous in Florida, Georgia, or the Carolinas. They are very rare in the northern and eastern parts of the United States. They were formerly abundant in Canada, but as their places of resort become settled and thickly peopled, they retire and seek refuge in the remotest recesses of the interior. In New England it appears to have been destroyed many years ago, but they are still found in the eastern parts of Pennsylvania and New Jersey.

These birds do not confine themselves to any particular food, but eat corn, berries, grapes, barley, tadpoles, young frogs, and lizards. Their favorite

food, however, is the pecan nut, and acorn. Where there is an abundant crop of acorns, there numerous flocks of turkeys may be expected. In the fall, they direct their courses in vast numbers to the rich lands on the borders of the Ohio and Mississippi. The males and females travel separately, but all in the same direction. Before crossing a river, they assemble on the highest eminences, and remain there as if in consultation for a day or two. At length, after due preparation, the leader gives a signal note, and they all wing their way to the opposite shore. Some of the young and weak fall into the water, and are obliged to swim for their lives, using all the means in their power, and the most violent exertion, to reach the shore. Many

however, perish in the attempt. It is observed that, after these journeys, the turkeys are so familiar, that they fearlessly enter the plantations in search of food. Great numbers are killed at this time, and kept in a frozen state to be sent to distant markets.

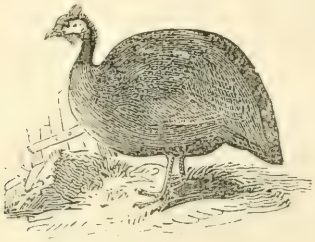
They begin to build in April; the nest is very simple in construction, being only composed of a few dried leaves. The female lays sometimes twenty, but more usually nine or fifteen eggs, which are white, spotted with brown. Wild turkeys are very tenacious of their feeding grounds, as well as of the trees on which they have once roosted. Flocks have been known to resort to one spot for a succession of years, and to return after a distant emigration in search of food. They roost on a point of land jutting into a river where there are large trees in great numbers. When they are all quiet for the night, they are very easily shot; and an experienced hunter may secure nearly the whole flock, as the turkeys, fancying themselves secure when at roost, are not alarmed by either the sportsman or his gun.

The flesh of the wild turkey is of excellent flavor, being more delicate and juicy than that of the domestic turkey; the Indians value it so highly, that they term it, when roasted, "the white man's dish."

The male of the wild turkey is nearly four feet in length; the female is only three feet and a quarter long. The plumage of the male is very brilliant, and of a variety of hues; that of the female is not as beautiful. When strutting abroad and displaying himself, this bird has a very stately and handsome appearance, and appears to be quite sensible of the admiration he excites.

A new species, called the ocellated turkey, has been discovered in Honduras, which is of a smaller size and of more brilliant plumage than the turkey of the United States. It has small ocellated spots on the tail.

THE PINTADO, OR GUINEA HEN,[1]



Is about the size of a common hen, but, as it is supported on longer legs, it looks much larger. It has a round back, with a tail turned downwards like a partridge. The head is covered with a kind of casque; and the whole plumage is black or dark grey, speckled with white spots. It has wattles under the bill, which do not proceed from the lower chap, as in cocks, but from the upper, which gives it a very peculiar air; while its restless gait, and odd chuckling sound, distinguish it sufficiently from all other birds whatever.

It is well known all over Europe and America, and we find it in different countries called by different names, from the place whence they had it. We have given it the name of that part of Africa from whence probably it was first brought, and where it is still found in a wild state. Among the Romans they were in high repute for the table, and, being scarce, were sold at a great price.

In many parts of their native country they are seen in vast flocks together, feeding their young, and leading them in quest of food. All their habits are like those of the poultry kind, and they agree in every other respect, except that the male and female are so much alike, that they can hardly be distinguished asunder. The principal distinction is in the wattles; those of the cock being of a bluish cast, while those of the female incline to red. Their eggs, like their bodies, are speckled; in our climate they lay but five or six in a season; but they are far more prolific in their sultry regions at home.

There is a species of this bird with a very beautiful crest. There are also some other varieties, which it would be tedious to describe.

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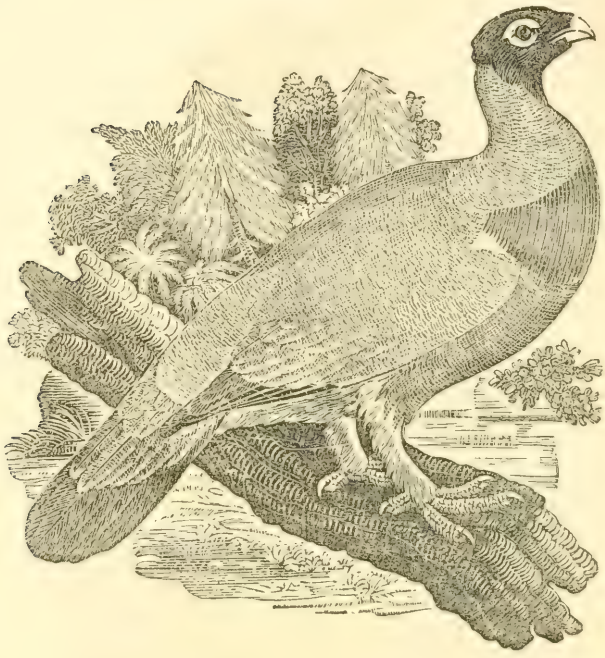
[1] *Numida meleagris*, Lin. The genus *Numida* has the bill short, thick, arched, the base covered with a warted membrane, and a carunculated wattle hanging from the under mandible; nostrils situated in the cere, divided by a cartilage, head naked or feathered, the crown with a callous horn or crest; tarsus smooth; the three fore toes united by membranes; hind toe joined on the tarsus; tail short; bent down.

THE WOOD GROUSE[1]



is about the size of a turkey, and frequently weighs near fourteen pounds; but the female is much smaller. The head and neck are ash color, crossed with black lines; the body and wings chesnut brown, and the breast of a very glossy blackish green. The legs are strong, and covered with brown feathers. The plumage of the female differs from this description, it being red about the throat, and having the head, neck, and back, crossed with red and black bars; the belly barred with orange and black, with the tips of the feathers white, as are also the tips of the shoulders.

The cock of the wood, when in the forest, attaches himself principally to the oak and the pine tree; the cones of the latter serving for his food, and the thick boughs for a habitation. He feeds also on ants' eggs; which seem

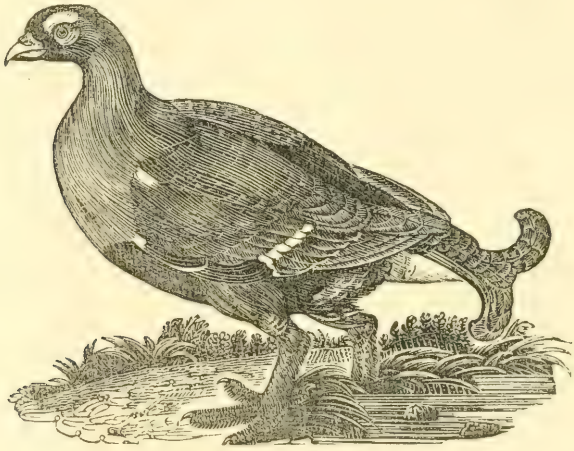
[1] *Tetrao urogallus*, Lin. The genus *tetrao* has the bill short, thick, arched above, convex, bent downwards towards the tip, base naked; nostrils basal, half closed, with an arched scale above, and connected by small feathers; eyebrows naked, with scarlet warts; tarsi feathered; three toes before and one behind, united to the first joint; one toe behind, margined with asperities.

a high delicacy to all birds of the poultry kind; cranberries are likewise often found in his crop. The female is much less than her mate, and entirely unlike him in plumage, so that she might be mistaken for a bird of another species. She seldom lays more than six or seven eggs, which are white, marked with yellow, of the size of a common hen's egg. She generally lays them in a dry place and mossy ground; and when she is obliged, during the time of incubation, to leave her nest in quest of food, she covers them up so artfully with moss or dry leaves, that it is extremely difficult to discover them.

As soon as the young ones are hatched, they are seen running with extreme agility after the mother, though sometimes they are not entirely disengaged from the shell. They soon come to perfection; they are a hardy bird; their food lies every where before them, and it would seem that they should increase in great abundance. But this is not the case; their numbers are thinned by rapacious birds and beasts of every kind, and still more by their own salacious contests. At sunrise and setting, during this season, the male may be seen extremely active upon one of the largest branches of a pine tree; his tail raised and expanded like a fan, his wings drooping, his neck stretched out, and his head swoln and red. His cry upon this occasion is a kind of loud explosion, followed by a noise like the whetting of a scythe. While under this influence, they fight each other like game-cocks; and are so inattentive to their own safety, that it often happens that two or three of them are killed at a shot. It is probable that, in these contests, the bird which comes off victorious takes possession of the female seraglio, as it is certain they have no faithful attachments. This species was once not uncommon in the Highlands of Scotland. It is now extinct in England, as well as in Ireland. The last Scotch specimen is said to have been killed about fifty years ago; and Ireland had previously ceased to possess the cock of the wood.

THE BLACK GROUSE, OR BLACK COCK,[1]

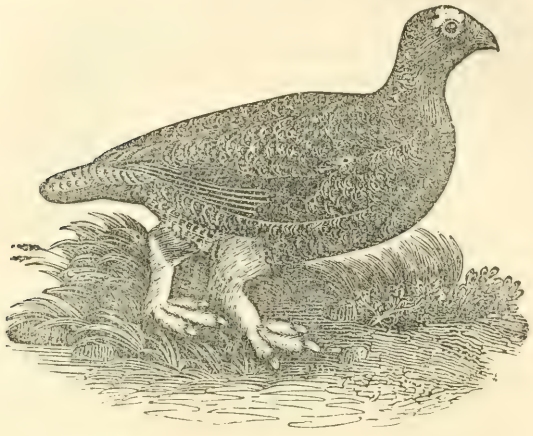
Is much more common. It is found in many parts of Europe, and in most of the moors in the north of England, Wales, and Scotland. Its name almost furnishes its description, since the whole body is black, which, however, is iridescent, and in some positions of the light, it shows a beautiful purple; but it has another remarkable characteristic, which is, that its tail is forked. It is rather larger than a common fowl, and is in length from twenty-four to twenty-eight inches. At the breeding season their contests are so furious, that in Courland, Livonia, &c., it is a common method of taking them, to assemble them together, by imitating the crowing of a black cock, and by having a figure prepared to imitate that animal in all its motions. The grouse, being collected in vast numbers from all parts, enter



into a bloody contest; when the combatants are so intent upon each other's destruction, that they fall an easy prey to their pursuers, and may even be knocked down with a stick. There is a variety of this species with a plain tail.

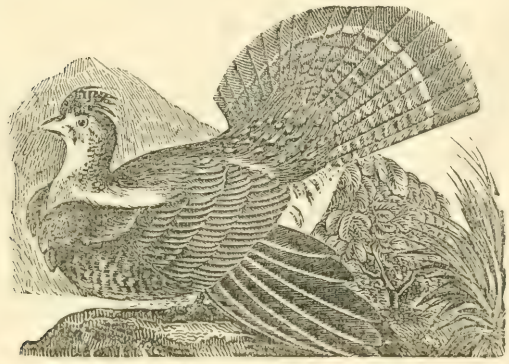
[1] *Tetrao tetrix*, Lin.

THE RED GROUSE, OR MOOR COCK,



Is also abundant in Great Britain, where are also found the *ptarmigan*, or white grouse. The *hazel* and *pintailed* grouse are found in different parts of Europe.

THE RUFFED GROUSE.[1]



This well known American bird is called *partridge*, in the New England states, and pheasant at the south, although neither the partridge nor pheas-

[1] *Tetrao umbellus*, Lin.

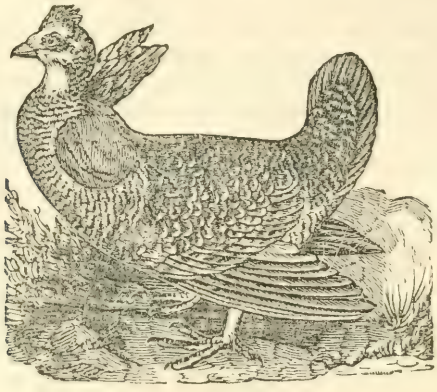
ant is found in America. The ruffed grouse is known in almost every quarter of the United States, and appears to inhabit a very extensive range of country. Its favorite places of resort are high mountains covered with the balsam, pine, hemlock, and such like evergreens. Unlike the pinnated grouse, it always prefers the woods; is seldom or never found in open plains; but loves the pine sheltered declivities of mountains near streams of water. In the lower parts of Georgia, Carolina, and Florida, they are very seldom observed; but as we advance inland to the mountains, they again make their appearance.

The manners of the ruffed grouse are solitary; they are seldom found in coveys of more than four or five together, and more usually in pairs or singly. They leave the woods early in the morning, and seek the path or road, to pick up gravel, and glean among the droppings of the horses. If the weather be foggy or lowering, they are sure of being found in such situations. They generally move along with great stateliness, their broad fan-like tail spread out. The drumming, as it is generally called, of the pheasant, is another singularity of this species. This is performed by the male alone. It is a kind of thump, like that produced by two full blown ox bladders being struck together; the strokes at first are low and distinct, but gradually increase in rapidity till they run into each other. This may be heard half a mile off, and is produced in the following manner.—The bird standing on an old prostrate log, lowers his wings, erects his tail, contracts his throat, elevates the two tufts of feathers on his neck, and inflates his whole body somewhat in the manner of the turkey cock, strutting and wheeling about with great stateliness. After a few manœuvres of this kind, he begins to strike with his stiffened wings in short and quick strokes, which become more and more rapid as has been described. This is most common in the morning and evening; and by this means the gunner is led to the place of his retreat.

The bird springs within a few yards, with a loud whizzing sound, and flies with great vigor through the woods beyond reach of view before it alights. They are exceedingly fond of the seeds of grapes, and eat chesnuts, blackberries, and ants. In the fall they feed on whortleberries and partridge berries, the last of which give their flesh a peculiar and delicate flavor. During winter they eat the buds of the alder and laurel. At this time their flesh is unwholesome.

The ruffed grouse is eighteen inches long. The upper parts of the body are of a bright rust color, marked with spots of white. The under parts are white, and the tail beautifully marked with black. There is a tuft of large black feathers on each side of the neck, which it occasionally raises.

THE PINNATED GROUSE, OR HEATH HEN,[1]



Is the individual known by the general name of grouse in New England. Open dry plains, thinly interspersed with trees, or partially overgrown with shrub oaks, are his favorite haunts. Accordingly he is found on the plains in New Jersey, in the barrens of Kentucky, on the bushy plains of Long Island, and in similar situations in Pennsylvania, Indiana territory, and Upper Louisiana; and, according to the late Governor Lewis, on the vast plains of the Columbia. They dislike marshes and watery places. Their great inducement in frequenting these plains, is probably the small acorn of the shrub oak, the strawberries, whortleberries, and partridge berries, with which they abound, and which constitute their principal food.

The most remarkable circumstance relative to these birds, is the two extraordinary bags of skin which mark the neck of the male, and which no writer has yet described. These appear to be formed by an expansion of the gullet, and the outer skin of the neck, which hang loose when the bird is at rest or flying. But when these are inflated, they very much resemble a fully ripe orange. By means of these, he is enabled to produce a booming sound, which consists of three notes, similar to those produced by the night hawk. While uttering these, the bird exhibits all the gesticulations of the turkey cock; erecting and fluttering his neck wings, wheeling and passing before the females, and close before his fellows, as in defiance. Now and then are heard some rapid cackling notes, not unlike that of some person tickled to excessive laughter; in short, no one can listen to them without feeling disposed to laugh.

Fresh ploughed fields are sure to be visited by these birds every morning. On one of these, says Wilson, I counted seventeen males, making such a

[1] *Tetrao cupido*, LIN.

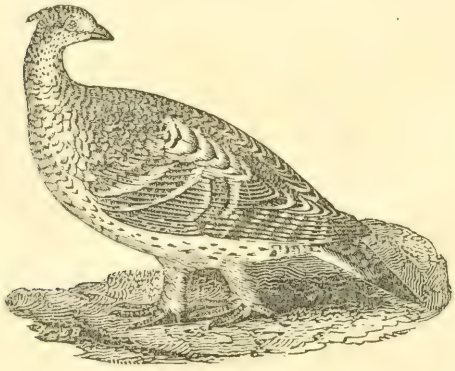
continued noise, as might have been heard a mile off. When snow comes, they become half domesticated, visit the barns, and farmhouses, and mix with the poultry. Great numbers are then taken in traps. Their nests are built on the ground, formed with little art, and few materials.

The pinnated grouse is nineteen inches long, and, when in good order, weighs three pounds and a half. There are small wings on each side of the neck, whose upper parts are mottled transversely with black, brown, and white. Over the eye is a semicircular comb of rich orange. The breast and belly are white, marked with brown.

THE DUSKY GROUSE[1]

In size and color, may be compared with the black grouse of Europe. A specimen was killed by an exploring party under Major Long, in 1820, on a mountain of the chain which divides the Mississippi from the waters which flow toward the Pacific. When the bird flew, it uttered a cackling note, somewhat like that of the domestic fowl. The general color of the plumage in the female is blackish brown; that of the male is entirely black.

THE SHARP-TAILED GROUSE[2]



Was first met with by the lamented Governor Lewis, on the upper waters of the Missouri. It is said to be the inhabitant of the great plains of the Columbia. The expedition under Major Long brought a specimen, now in the museum at Philadelphia. This bird is never seen in any of the Atlantic

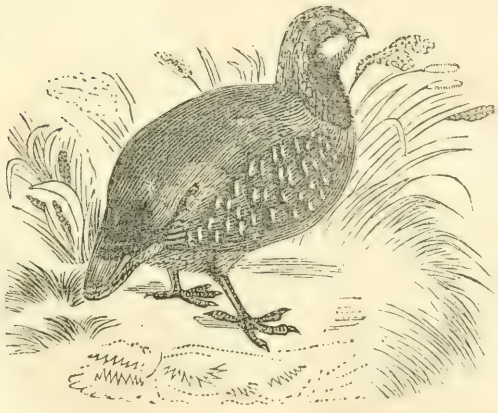
[1] *Tetrao obscurus*, Say. [2] *Tetrao phasianellus*, Lin.

states, though numerous in high northern latitudes. It inhabits the uncultivated lands near the southern parts of Hudson's Bay. It is sometimes found near Lake Superior in the spring.

The sharp-tailed grouse is very shy and solitary in summer, but lives in flocks during winter. Their favorite places of resort are the juniper plains, where the buds of juniper bushes constitute their favorite food. They frequent the woods as well as the plains; sometimes feeding on berries, and sometimes on the tops of evergreen, poplar, and birch trees. They breed on the ground, near low bushes; the nest is composed of grass and lined with feathers. Their flesh is excellent eating. One of these birds will sometimes weigh upwards of two pounds. The general color of the plumage is a mixture of white and rusty on a glossy blackish ground; the feathers of the head and neck are tipped with white.

The other American birds of this family are, the spotted grouse, and the cock of the plains.

THE PARTRIDGE.[1]



This bird is about thirteen inches in length. The general color of its plumage is brown and ash, elegantly mixed with black; each feather is streaked down the middle with buff color; the sides of the head are tawny; the eyes are hazel, and under each eye there is a small saffron-colored spot,

[1] *Perdix cinerea*, Lath. The genus *perdix*, has the bill short, compressed, stout, base naked; upper mandible arched, convex, strongly curved towards the tip; nostrils basal, lateral, half closed by an arched and naked membrane; the three anterior toes united by membranes to the first joint; tail composed of eighteen, or of fourteen feathers, short, rounded and slanting downwards; wings short.

which has a granulated appearance, and between the eye and the ear is a naked skin of a bright scarlet, which is not very conspicuous but in old birds; on the breast there is a crescent of a deep chesnut color; the tail is short; the legs are of a greenish white, and are furnished with a small knob behind. The bill is of a light brown. The female has no crescent on the breast, and her colors in general are not so distinct and bright as those of the male. There are generally from ten to fifteen in a covey; and if unmolested, they live from fifteen to seventeen years.

This bird is found in nearly every part of Europe. The manners of the partridge, in most circumstances, resemble all those of poultry in general; but their cunning and instinct seem superior to those of the larger kinds. Perhaps, as they live in the very neighborhood of their enemies, they have more frequent occasion to put their little arts in practice, and learn, by habit, the means of evasion or safety. The affection of the female for her young is peculiarly strong and lively; she is greatly assisted in the care of rearing them by her mate; they lead them out in common, call them together, point out to them their proper food, and assist them in finding it, by scratching the ground with their feet. They frequently sit close by each other, covering their young with their wings, like the hen; in this situation they are not easily flushed; but when, at length, they are compelled to move, the male employs many interesting stratagems, such as fluttering along the ground, hanging his wings, and feigning to be wounded, in order to attract the pursuit of the enemy, and afford to the female an opportunity to escape with her infant brood. Partridges, though tamed when young, will almost invariably return to the wild state.

THE EUROPEAN QUAIL[1]

Is about half the size of a partridge. Its flesh is a great delicacy. The feathers of the head are black, edged with rusty brown; the breast is of a pale yellowish red, spotted with black; the feathers on the back are marked with lines of pale yellow, and the legs are of a pale hue.

The quail is by all known to be a bird of passage; and yet, if we consider its heavy manner of flying, and its dearth of plumage, with respect to its corpulence, we shall be surprised how a bird so apparently ill qualified for migration should take such extensive journeys. Nothing, however, is more certain. "When we sailed from Rhodes to Alexandria," says Bellonius, "about autumn, many quails, flying from the north to the south, were taken in our ship; and sailing at spring time the contrary way, from the south to the north, I observed them on their return, when many of them were taken in the same manner." This account is confirmed by many others; who

[1] *Perdix coturnis*, LATH.

aver, that they choose a north wind for these adventures; the south being very unfavorable, as it retards their flight, by moistening their plumage. They then fly two by two; continuing, when their way lies over land, to go faster by night than by day; and to fly very high, to avoid being surprised, or set upon by birds of prey. On the western coasts of the kingdom of Naples, and on the shores of Provence, such prodigious flights have appeared that a hundred thousand have been taken in a day within the space of four or five miles. It is now, however, asserted by some, that the quail only migrates from one province of a country to another. For instance, that in England they fly from the inland counties to those bordering on the sea, and continue there all the winter.

These birds are much less prolific than the partridge; seldom laying more than six or seven whitish eggs; marked with ragged, rust-colored spots. Quail fighting was a favorite amusement among the Athenians; they abstained from the flesh of this bird, deeming it unwholesome, as supposing that it fed upon the white hellebore; but they reared great numbers of them, for the pleasure of seeing them fight; and staked sums of money upon them as we do with cocks, upon the success of the combat. The same practice is at this day carried on in China and in some parts of Italy.

THE AMERICAN QUAIL,[1]

Called *partridge* in the southern states, is an inhabitant of North America, from Canada and Nova Scotia to Florida, and it has been seen in the interior of Louisiana. These birds rarely frequent the forest, and are most numerous in the vicinity of well cultivated plantations, where there is plenty of grain. They however occasionally seek shelter in the woods, perching on the branches, or secreting among the brushwood; but are found most usually in open fields or along fences sheltered by thickets of brier. In winter, they approach the barns and sometimes mix with the poultry. At this time great numbers of them are shot and taken in traps.

The quail builds its nest on the ground, at the bottom of a thick tuft of grass that shelters and conceals it. The materials are leaves and fine dry grass. It is well covered above, and an opening left for entrance. The young are guided by their mother's voice, which resembles that of a young chicken, and sheltered by her wings in the same manner as those of the domestic fowl. In this situation, should the timid little family be unexpectedly surprised, the utmost alarm and consternation instantly prevail. The mother throws herself in the path, fluttering along and beating the ground

[1] *Perdix Virginiana*, Lath.

with her wings, as if sorely wounded; using every artifice she is mistress of, to entice the passenger in pursuit of herself, uttering at the same time peculiar notes of alarm well understood by the young, who dive separately among the grass, and secrete themselves till the danger is over; and the parent, having decoyed the pursuer to a safe distance, returns by a circuitous route to collect and lead them off.

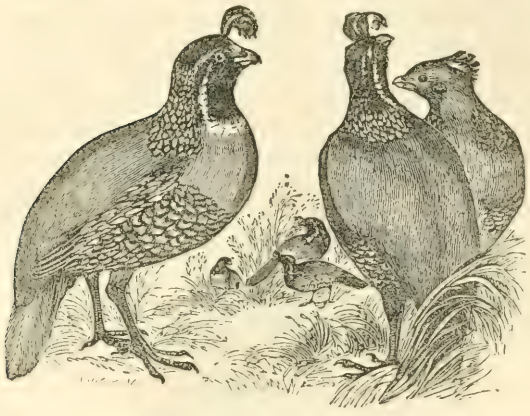
In the fall, the quails associate in flocks or coveys, of four or five and thirty. At this time the notes of the male are frequent, loud, and distinct. His common call consists of two notes, and is similar to the sound produced by pronouncing the words "Bob White." This call may be imitated by whistling, so as to deceive the bird itself, and bring it near. While uttering this, the bird is usually perched on the rail of a fence or on a low limb of an

apple tree, where he will sometimes sit, repeating, at short intervals, "Bob White," for half an hour at a time.

The food of the partridge consists of grain, seeds, insects, and berries of various kinds. Buckwheat and Indian corn are particular favorites. They roost at night in the middle of a field on high ground. They fly with a loud whizzing sound, occasioned by the shortness, concavity, and rapid motion of their wings, and the comparative weight of their bodies. The flesh is peculiarly white, tender, and delicate.

The quail is nine inches long. It is of a red brown color, sprinkled with black. The under parts are white, spotted with black, and the sides of the neck spotted with white.

THE CALIFORNIAN QUAIL.[1]



The general color of the upper part of the body and wings in the Californian quail, is of a dusky brown, assuming a leaden or slaty tinge on the tail, and on the fore part of the breast, upon which it advances in the form of a broad band. The fore part of the head is of a mixed ash gray, and the hinder part blackish brown.

ORDER XI.—ALECTORIDES.

Birds of this order have the bill shorter than the head, or the same length, strong, robust, upper mandible convex, and often hooked at the point; tarsus long and slender; three toes before and one behind; the hind toe articulated higher up than those before.

THE HORNED SCREAMER[2]

Is a native of Brazil. This is a water-fowl of the rapacious kind, and bigger than a swan. The head, which is small for the size of the body, bears

[1] *Perdix californica*, Lath.

[2] *Palamedea cornuta*, Lath. The genus *palamedea* has the bill short, conico-convex much curved at the point, compressed throughout its length; nasal furrow large; head small, covered with down, and around with a slender flexible horn; nostrils remote from the base of the bill, lateral, oval, open; legs short, thick; toes very long, the lateral connected with the intermediate by a short membrane; wings ample, and spurs on the winglets.

a black bill, which is not above two inches long; but what distinguishes it in particular is a horn growing from the forehead as long as the bill, and bending forward like that of the fabulous unicorn of the ancients. This horn is not much thicker than a crow-quill, as round as if turned in a lathe, and of an ivory color. But this is not the only instrument of battle this formidable bird carries; it seems to be armed at all points; for at the fore-part of each wing, at the second joint, spring two straight triangular spurs, about as thick as one's little finger; the foremost of these goads or spurs is above an inch long; the hinder is shorter, and both of a dusky color. The claws also are long and sharp; the color is a mixed black, gray, and white, with a little yellow in some places; and they make a very loud noise, often repeating the notes *wyhu, wyhu.* They are never found alone, but always in pairs; the cock and hen prowl together; and their fidelity is said to be such, that when one dies, the other never departs from the carcass, but dies with its companion. It makes its nest of clay, near the bodies of trees, upon the ground, of the shape of an oven. There is another species of screamer, which is crested and without the horn.

ORDER XII.—CURSORES.

Birds of this order have the bill middle sized, or short; legs long, naked above the knee; and with only two or three toes, directed forward. These birds live always in the fields, and most frequently in desart places remote from woods.

THE OSTRICH[1]

Is generally considered as the largest of birds, but its size serves to deprive it of the principal excellence of this class of animals, the power of flying. The medium weight of this bird may be estimated at seventy-five or eighty pounds, a weight which would require an immense power of wing to elevate into the atmosphere; and hence all those of the feathered kind which approach to the size of the ostrich, such as the touyou, the cassowary, the dodo, neither possess, nor can possess, the faculty of flight. The head and bill of the ostrich somewhat resemble those of the duck; and the neck may be compared to that of a swan, but that it is much longer; the legs and thighs resemble those of a hen; though the whole appearance at a distance bears a strong resemblance to that of a camel; it is usually seven feet high

[1] *Struthio camelus*, Lin. This is the only one of the genus. Its characteristics are—a bill obtuse, straight, depressed at the tip, which is rounded and unguiculated; mandibles equal and flexible; nostrils near the middle of the bill; legs very long, robust, and muscular, with only two strong toes directed forward, but the inner much shorter than the outer; the former provided with a large and blunt claw, the latter clawless; tibia very fleshy to the knee; wings unfit for flight, being composed of long, soft, and flexible feathers, and armed with a double spur.

from the top of the head to the ground; but from the back it is only four; so that the head and neck are above three feet long. Some reach the height of nine feet. From the top of the head to the rump, when the neck is stretched out in a right line, it is six feet long, and the tail is about a foot more. One of the wings, without the feathers, is a foot and a half; and being stretched out, with the feathers, is three feet.

The plumage is much alike in all; that is, generally black and white; though some of them are said to be gray. The greatest feathers are at the extremities of the wings and tail, and the largest are generally white. The next row is black and white; and of the small feathers on the back and belly, some are white and others black. There are no feathers on the sides, nor yet on the thighs, nor under the wings. The lower part of the neck, about half way, is covered with still smaller feathers than those on the belly

and back; and those, like the former, also are of different colors. The head and upper part of the neck are covered with hair.

At the end of each wing there is a kind of spur, almost like the quill of a porcupine. It is an inch long, being hollow, and of a horny substance. There are two of these on each wing; the largest of which is at the extremity of the bone of the wing, and the other a foot lower. The neck seems to be more slender in proportion to that of other birds, from its not being furnished with feathers.

The thighs are very fleshy and large, being covered with a white skin, inclining to redness, and wrinkled in the manner of a net, whose meshes will admit the end of a finger. Some have very small feathers here and there on the thighs; and others again have neither feathers nor wrinkles. The legs are covered before with scales. The end of the foot is cloven, and has two very large toes, which, like the leg, are covered with scales. These toes are of equal sizes. The largest, which is on the inside, is seven inches long, including the claw, which is near three fourths of an inch in length, and almost as broad. The other toe is but four inches long, and is without a claw.

The ostrich is a native only of the torrid regions of Africa and Arabia, and has never bred out of those countries which first produced it. Though, however, the climate of France be much less warm than that of Barbary, yet some ostriches have been known to lay in the royal menagerie at Versailles; but the gentlemen of the Academy have in vain attempted to make these eggs produce by an artificial process. This bird, so disqualified for society with man, inhabits, from preference, the most solitary and horrid deserts, where there are few vegetables to clothe the surface of the earth, and where the rain never comes to refresh it. The Arabians assert that the ostrich never drinks; and the place of its habitation seems to confirm the assertion. In these formidable regions ostriches are seen in large flocks, which to the distant spectator appear like a regiment of cavalry, and have often alarmed a whole caravan. There is no desert, how barren soever, but is capable of supplying these animals with provision; they eat almost every thing; and these barren tracts are thus doubly grateful, as they afford both food and security. In Southern Africa they are exceedingly injurious to the farmers, as they will destroy a field of wheat so effectually as not to leave a single ear behind; and this operation they perform without danger to themselves, as they are so vigilant and so swift, that it is almost impossible to get a shot at them. The ostrich is of all animals the most voracious. It will devour leather, grass, hair, iron, stones, or any thing that is given. Nor are its powers of digestion less in such things as are digestible. Those substances which the coats of the stomach cannot soften, pass whole; so that glass, stones, or iron, are excluded in the form in which they are devoured. All metals, indeed, which are swallowed by any animal, lose a part of their weight, and often the extremities of their figure, from the

action of the juices of the stomach upon their surface. A quarter pistole, which was swallowed by a duck, lost seven grains of its weight in the gizzard before it was voided; and it is probable that a still greater diminution of weight would happen in the stomach of an ostrich. Considered in this light, therefore, this animal may be said to digest iron; but such substances seldom remain long enough in the stomach of any animal to undergo so tedious a dissolution. The ostrich lays very large eggs, some of them being above five inches in diameter, and weighing above five pounds. These eggs have a very hard shell, somewhat resembling those of the crocodile, except that those of the latter are less and rounder. It is a curious fact, that these eggs often contain a number of small, exceedingly hard oval-shaped pebbles, about the size of a marrowfat pea, and of a yellow color. They are sometimes set, and used as buttons.

The season for laying depends upon the climate; in the northern parts of Africa it is about the beginning of July; in the south, it is about the latter end of December. These birds are very prolific, and lay generally from thirty to forty eggs in a season, and about twelve at one clutch. It has been commonly reported that the female deposits them in the sand; and, covering them up, leaves them to be hatched by the heat of the climate, and then permits the young to shift for themselves. Very little of this however is true; no bird has a stronger affection for her young than the ostrich, and none watches her eggs with greater assiduity. It happens, indeed, in those hot climates, that there is less necessity for the continual incubation of the female; and she more frequently leaves her eggs, which are in no fear of being chilled by the weather: but though she sometimes forsakes them by day, she always carefully broods over them by night; nor is it more true that they forsake their young after they are excluded from the shell. On the contrary, the young ones are not even able to walk for several days after they are hatched. During this time, the old ones are very assiduous in supplying them with grass, and very careful to defend them from danger; nay, they encounter every danger in their defence.

The strength and size of the ostrich has suggested to men the experiment of using them as animals of burthen. The tyrant Firmius, who reigned in Egypt about the end of the third century, was frequently carried by large ostriches. Moore, an English traveller, relates that he had seen at Joar, in Africa, a man travelling on an ostrich. And Vallisnieri speaks of a young man, who exhibited himself upon one of these birds at Venice. In fine, M. Adanson saw, at the factory at Podor, two ostriches, which were yet young, of which the stronger went at a pace which would have distanced the fleetest English racehorse, with two negroes on its back. Whether this bird could be broken and tamed so as to carry its rider with the same safety and docility as a horse, is a different question; and, let it be remembered that, though the ostriches above-mentioned ran for a short time

faster than a racehorse, there is no reason to believe they could hold out so long.

From ancient writers we learn, that whole nations have acquired the name of Struthiophagi (ostrich-eaters) from the preference which they had manifested for the flesh of this bird. Apicius has recommended a peculiar sauce for the ostrich, which shows at least that it was eaten among the Romans, and at a single feast the emperor Heliogabalus was served with the brains of *six hundred* of these animals. Even at this period, some of the savage nations of Africa hunt them not only for their plumage, but for their flesh also, which they consider as a dainty. They sometimes also breed these birds tame to eat the young ones, of which the female is said to be the greatest delicacy. The skin of the ostrich is so thick, that it is used for leather by the Arabians; and of the eggs drinking cups are made. The value of the plumage is well known in most countries of Europe.

As the spoils of the ostrich are thus valuable, it is not to be wondered at that man has become their most assiduous pursuer. For this purpose, the Arabians train up their best and fleetest horses, and hunt the ostrich still in view. Perhaps, of all varieties of the chase, though the most laborious, it is yet the most entertaining. As soon as the hunter comes within sight of his prey, he puts his horse to a gentle gallop, so as to keep the ostrich still in sight; yet not so as to terrify him from the plain into the mountains. Upon observing himself, therefore, pursued at a distance, the bird begins to run at first, but gently, either insensible of his danger, or sure of escaping. In this situation he somewhat resembles a man at full speed; his wings, like two arms, keep working with a motion correspondent to that of his legs; and his speed would very soon snatch him from the view of his pursuers, but, unfortunately for the silly creature, instead of going off in a direct line, he takes his course in circles; while the hunters still make a small course within, relieve each other, meet him at unexpected turns, and keep him thus still employed, still followed, for two or three days together. At last, spent with fatigue and famine, and finding all power of escape impossible, he endeavors to hide himself from those enemies he cannot avoid, and covers his head in the sand, or the first thicket he meets. Sometimes, however, he attempts to face his pursuers; and, though in general, the most gentle animal in nature, when driven to desperation, he defends himself with his beak his wings, and his feet. Such is the force of his motion, that a man would be utterly unable to withstand him in the shock.

The Struthiophagi had another mode of capturing these animals. They disguised themselves in the skin of an ostrich, and putting one of their arms through the neck, they imitated all its motions. By this means they are said to have enabled themselves to approach and take them at pleasure. In the same manner the savages of America disguise themselves as a roebuck, in order to surprise that animal.

Ostriches are sometimes bred in flocks, for they are easily tamed. In this domesticated state they play and frisk about with vivacity, and are tractable and familiar towards those who are acquainted with them. To strangers, however, they are often fierce, and will attack them with fury, making an angry hissing noise, and having their throats inflated, and their mouths open. During the night they frequently utter a discordant cry, which bears a resemblance to the distant roaring of a lion, or the hoarse tone of a bear or an ox when in great agony.

THE TOUYOU, OR AMERICAN OSTRICH.[1]

It is chiefly found in Guiana, along the banks of the Oroonoko, in the inland provinces of Brazil and Chili, and the vast forests that border on the mouth of the river Plata. Many other parts of South America were known to have them; but as man multiplied, these large and timorous birds either fell beneath their superior power, or fled from their vicinity. It is said to be found in Patagonia, and the natives are represented as chasing it on horseback, and killing it with clubs when they approach sufficiently near.

The touyou, though not so large as the ostrich, is only second to it in magnitude. It is by much the largest bird in the New Continent, and is generally found to be six feet high, measuring from its head to the ground. Its legs are three feet long. Its body is of an oval form, and appears entirely round. It is covered from the back and rump with long feathers; these feathers are gray upon the back, and white on the belly, and it has no other tail. It goes very swiftly, and seems assisted in its motion by a kind of tubercle behind, like a heel, upon which, on plain ground, it treads very securely; in its course it uses a very odd kind of action, lifting up one wing, which it keeps elevated for a time; till letting it drop, it lifts up the other; it runs with such swiftness, that the fleetest dogs are sometimes thrown out in the pursuit. One of them, finding itself surrounded by the hunters, darted among the dogs with such fury, that they made way to avoid its rage; and it escaped, by its amazing velocity, in safety to the mountains. It defends itself with its feet, and calls its young by a kind of hiss.

Nieremberg relates, that, during incubation, they generally make a false nest at some distance from the true one; in this they lay two eggs, which are afterwards broken by the old bird, and by attracting a number of flies,

[1] *Rhea Americana*, Temm. This is the only one of the genus. Its characteristics are a bill straight, short, soft, depressed at the base, a little compressed at the tip, which is obtuse; lower mandible much depressed, flexible, and rounded at the tip; nostrils on the lateral surface of the bill, large, longitudinally cleft and open; legs long, with three toes before, and a callosity behind; wings short, with feathers more or less strong, and terminating in a spur.

beetles, &c., afford a means of sustenance to the young. This, however, may be considered as apocryphal.

When first hatched, the young ones are familiar, and follow the first person they meet. I have been followed myself, says Wafer, by many of these young ostriches, which at first are extremely harmless and simple; but, as they grow older, they become more cunning and distrustful; and run so swift, that a greyhound can scarcely overtake them. Their flesh, in general,

is good to be eaten, especially if they be young. It would be no difficult matter to rear up flocks of these animals tame, particularly as they are naturally so familiar; and they might be found to answer domestic purposes, like the hen or the turkey. Their maintenance could not be expensive, if, as Narborough says, they live entirely upon grass. Like the ostrich, the touyou is indiscriminately voracious; swallowing stones, iron, and other hard substances.

THE NEW HOLLAND EMEU.[1]

This bird has been so scientifically described by Mr Bennett, from specimens in the Tower, that we cannot do better than to adopt his description. "The distinctive generic characters of the New Holland emeu, which forms part of the ostrich family, and is, with the sole exception of the ostrich, the largest bird known to exist, consist in the flattening of its bill from above downwards, instead of from side to side; in the absence of the bony process which crests the head of the cassowary, of the wattles which depend from his neck, and of the long spurlike shafts which arm his wings; and in the equal, or nearly equal, length of all his claws. The emeus, however, agree with the cassowaries in the number of their toes, three on each foot, all of them directed forwards, and extremely thick and short, the posterior toe, which is common in most of the order, being in them entirely wanting; in the excessive shortness of their wings, which do not even, as is the case with the ostriches, assist them in running, much less in flight, of which, in common with the latter, they are absolutely incapable; and in the structure of their feathers, which are for the most part double, each tube being divided near its origin into two shafts, the barbs of which are soft, downy, and distinct from each other, and assume at a distance rather the appearance of a silky covering of hair, than that of the common plumage of birds.

"The New Holland bird has the head and upper part of the neck thinly covered with slender black feathers; the space around the ears being alone left bare, and exhibiting, as well as the neck and throat, which are but

[1] *Dromaius Novæ Hollandiæ*, Shaw. This is the only individual of the genus. Its characteristics are, bill straight, the edges greatly depressed, tip rounded; head feathered throat naked; feet three-toed, the toes placed before; wings very short.

partially concealed by the scattered plumage with which they are provided, the blue tinge of the skin. The general color of the skin is grayish brown above, with a more plentiful intermixture of the gray, and a consequently lighter tinge beneath. The young are striped longitudinally with brown and gray. Their bill is black, and their legs are remarkably thick and of a dull brown. The great length of the latter and of the neck, and the erect attitude and quiet demeanor of these birds, which sometimes attain as much as seven feet in height, give them altogether a noble and imposing appearance. They were formerly common in the neighborhood of Botany Bay subsisting, like the rest of their tribe, upon vegetable substances, chiefly fruits. They are extremely wild, and run with great swiftness when pursued; outstripping, it is said, the fleetness of the greyhound. Like the kanguroos, they are sometimes hunted by the colonists as articles of food; and their flesh is stated to have much of the flavor of beef. The quantity of provision supplied by one of these birds is by no means inconsiderable."

THE GREAT BUSTARD[1]

Is the largest land bird that is a native of Europe. It was once much more numerous than it is at present; but the increased cultivation of the country, and the extreme delicacy of its flesh, have greatly thinned the species; so that the time may come when it may be doubted whether so large a bird was ever bred there. It is probable that, long before this, the bustard would have been extirpated, but for its peculiar manner of feeding. It inhabits only the open and extensive plain, where its food lies in abundance, and where every invader may be seen at a distance.

The weight of this bird varies considerably; some have been found of not more than ten pounds, others have been found of twenty-seven and even thirty. The female is not more than half the size of the male. The bustard is distinguished from the ostrich, the touyou, the cassowary, and the dodo, by its wings, which, although disproportioned to the size of its body, yet serve to elevate it in the air, and enable it to fly, though with some difficulty; they are generally about four feet from the tip of one to the other. The neck is a foot long, and the legs a foot and a half. The head and neck of the male are ash colored; the back is barred transversely with black, and bright rust color. The greater quill feathers are black, the belly white, and the tail, which consists of twenty feathers, is marked with broad black bars.

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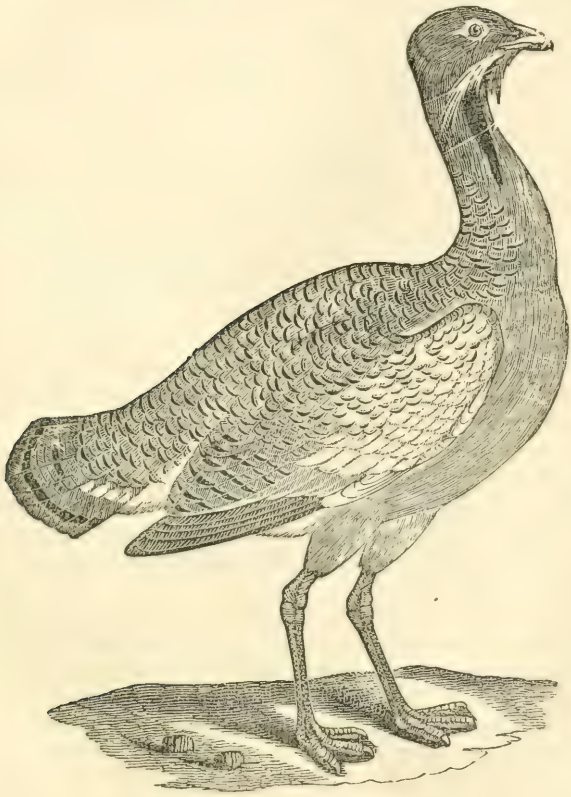
[1] *Otis tarda*, Lin. The genus *Otis* has the bill straight, conical, compressed; tip of the upper mandible slightly arched; nostrils open, oval, approximated, but remote at the base; legs long, naked above the knee; three toes before, short, united at their base, and bordered by a membrane; wings of medium length; third quill feather longest.

The bustard (according to Plutarch) was found in Libya, in the environs of Alexandria, in Syria, in Greece, in Spain, in France, in the plains of Poitou and Champagne; they are now and then seen in England, on the extensive downs of Salisbury Plain, in the heaths of Sussex and Cambridgeshire, the Dorsetshire uplands, and as far as East Lothian, in Scotland. In those extensive plains, where there are no woods to screen the sportsman, no hedges to creep along, the bustards enjoy an indolent security. Their food



is composed of the berries that grow among the heath, and the large earthworms that appear in great quantities on the downs before sunrising in summer. They also eat green corn, the tops of turnips, and other vegetables; and have even been known to devour frogs, mice, and young birds. It is in vain that the fowler creeps forward to approach them; they have always sentinels placed at proper eminences, which are ever on the watch, and warn the flock of the smallest appearance of danger. All therefore that

is left the sportsman, is the comfortless view of their distant security. He may wish, but they are in safety.

It sometimes happens that these birds, though they are seldom shot by the gun, are run down by greyhounds. As they are voracious and greedy, they often sacrifice their safety to their appetite, and feed themselves so very fat, that they are unable to fly without great preparation. When the greyhound, therefore, comes within a certain distance, the bustard runs off, flapping its wings, and endeavoring to gather air enough under them to rise; in the mean time the enemy approaches nearer, till it is too late for the bird even to think of obtaining safety by flight; for just at the rise there is always time lost, and of this the bird is sensible; it continues, therefore, on the foot until it is taken.

As there are few places where they can at once find proper food and security, so they generally continue near their old haunts, seldom wandering above twenty or thirty miles from home. As their food is replete with moisture, it enables them to live upon these dry plains, where there are scarcely any springs of water, a long time without drinking. Besides this, nature has given the males an admirable magazine for their security against thirst. This is a pouch, the entrance of which lies immediately under the tongue, and capable of holding near seven quarts of water. This is probably filled upon proper occasions, to supply the hen when sitting, or the young before they can fly. The bustard also makes use of its reservoir to defend itself against birds of prey; which it effects by ejecting the water with such violence as often to arrest the progress of its enemy.

They form no nest, but only scrape a hole in the earth, and sometimes line it with a little long grass or straw. They lay two eggs only, almost of the size of a goose egg, of a pale olive brown, marked with spots of a darker color. They hatch for about thirty days, and the young ones run about as soon as they are out of the shell.

It is said that when the persecuted mother is apprehensive of the hunters, and is disturbed from her nest, she takes her eggs under her wing, and transports them to a place of safety. The fact is, however, that following the instinct of all other birds of this kind, they generally make their nests in the corn, where they are almost certain of remaining undisturbed.

The bustard is not known in America. Besides the delicacy of their flesh, the quills are valuable, as they make excellent pens, but they are still more esteemed by anglers, who use them as floats; for, as they are spotted with black, the notion is, that these black spots appear as flies to the fish, which they rather allure than drive away by their appearance.

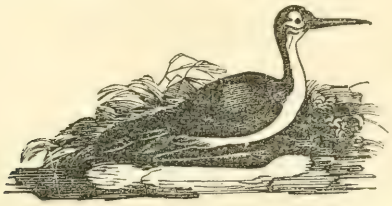
THE LITTLE BUSTARD[1]

Differs only from the preceding in being of a smaller size, being not larger than a pheasant, or about seventeen inches in length. This species is found in many parts of Europe. It is, however, by no means common in France, and has only been met with three or four times in England.

ORDER XIII.—GRALLATORES.

Birds of this order have the bill of various forms, but most frequently straight, in the form of an elongated cone, and compressed, more rarely depressed or flat; legs slender, long, more or less naked above the knee, three toes before and one behind, the posterior one jointed at the level of those before, or more elevated. These birds frequent the margin of the sea, or the banks of lakes and rivers, feeding on fish, worms, or insects. They are almost all semi-nocturnal.

THE LONG-LEGGED PLOVER.[2]



This singular bird, we might perhaps justly say, most singular of birds, inhabits the south of Europe, Asia, Africa, and America, but very rarely visits England. Chance alone seems to drive it to that country. It has a slender, black bill, two inches and a half in length; the irides are red; the forehead, round the eye, and all the under parts, are white; the back, the crown of the head, and the wings, are glossy black; the hind part of the neck is marked with dusky spots; the rump is white; the tail the same, inclining to grey; the outer feathers are quite white, the legs red; and the outer and middle toes connected at the base.

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[1] *Otis tetrax*, Lin.

[2] *Himantopus melanopterus*, Meyer. The genus *Himantopus* has the bill long, slender, cylindrical, flattened at the base, compressed at the point; mandibles laterally channelled to the half of their length; nostrils lateral, linear, long; legs very long and slender, with three toes before, of which the intermediate is united to the outer by a broad membrane, and to the inner by a rudimentary one; claws very small and flat; wings very long; the first feathers much longer than the others.

But the circumstance which makes this bird differ from all others, is the astonishing and seemingly preposterous length of its legs. Mr White has given a very pleasing description of this natural curiosity.

"These birds might with propriety be called the stilt plovers. My specimen, when drawn and stuffed with pepper, weighed only four ounces and a quarter, though the *naked* part of the thigh measured three inches and a half. Hence we may safely assert, that these birds exhibit weight for inches, and have incomparably the greatest length of legs of any known bird. The flamingo, for instance, is one of the most long-legged birds, and yet it bears no manner of proportion to the himantopus, as this bird is denominated by naturalists; for a cock flamingo weighs, at an average, about four pounds avoirdupois; and his legs and thighs measure usually about twenty inches. But four pounds are fifteen and a fraction times more than four ounces and a quarter; and if four ounces and a quarter have eight inches of legs, four pounds must have one hundred and twenty inches and a fraction of legs, or somewhat more than ten feet; such a monstrous disproportion as the world never saw. If we try the experiment in still larger birds, the disparity will increase.

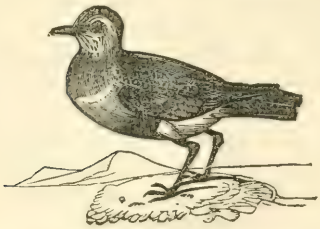
"It must be matter of great curiosity to see the stilt plover move; to observe how it can wield such a length of lever with such feeble muscles as the thighs seem to be furnished with. At best, one would expect it to be a bad walker; but what adds to the wonder is, that it has no back toe"

THE GOLDEN PLOVER.[1]

The golden, or green plover, is a well known bird, and is found in small flocks, in the winter time, on all our moors, heaths, &c., where it feeds chiefly on worms. It is remarkable for the whole of its plumage being elegantly variegated with a fine, yellowish green. From its spots somewhat resembling those of a leopard, the ancients called it pardalis. It may be enticed within gunshot, by a skilful imitator of their voice, and is esteemed as a delicacy. It is eleven inches in length, weighs nine ounces, and is found in France, Switzerland, Italy, and most parts of England.

[1] *Charadrius pluvialis*, Lin. The genus *Charadrius* has the bill shorter than the head, slender, straight, compressed; mandibles gibbous toward the tip; nostrils longitudinally cleft in the large membrane which covers the nasal furrow; legs slender, with three toes before, the outer connected with the middle one by a short membrane, and the inner divided; tail slightly rounded or even; wings middle sized; the second quill feather longest.

THE DOTTEREL[1]



Is about ten inches in length, and weighs four ounces. The bill is shorter than that of the majority of this genus, being only an inch long. The head is black, spotted with white, and a white stroke runs over each eye, meeting behind. The upper parts of the plumage are grayish brown, margined with a dull, deep yellow. The breast is a dull orange, and across it is a streak of white, margined above with black. The colors of the female are less vivid. It is esteemed a very foolish bird; and was believed to mimic the actions of the fowler, to stretch out a wing when he stretched out an arm, &c., regardless of the net which was spreading for it. They appear in England in small flocks, from April to September.

THE RINGED PLOVER.[2]

The ringed plover is seven inches and a half long, though it weighs but two ounces; the bill is half an inch long, and from it to the eyes runs a black line. The upper part of the neck is encircled with a white collar, the lower part with a black one. The back and wings are light brown, the breast and belly are white, the legs yellow. They frequent the shores of England in summer, and are sometimes known by the name of the sea lark. They are also common in America.

THE LAPWING.[3]

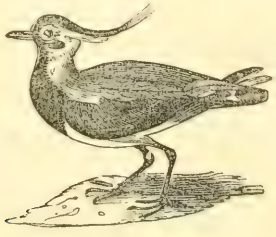
The lapwing, or bastard plover, is about the size of a common pigeon, and is covered with very thick plumes, which are black at the roots, but of diffe-

[1] *Charadrius morinellus*, Lin. [2] *Charadrius hiaticula*, Lin.

[3] *Vanellus cristatus*, Meyer. The genus *Vanellus* has the bill short, slender, straight, compressed, tip gibbous; nostrils lateral, longitudinally cleft; legs slender, with three toes before and one behind; the middle one connected with the outer by a short membrane and the hinder one almost obliterated, or very short, not touching the ground; wings elongated.

rent color on the outward part. The feathers on the belly, thighs, and under the wings, are most of them white as snow; and the under part on the outside of the wings white, but black lower. The back is of a dark green, glossed with blue shades. The head and crest are black, and the latter, which is composed of unwebbed feathers, is almost four inches in length. It has a great liver, divided into two parts, and, as some authors affirm, no gall.

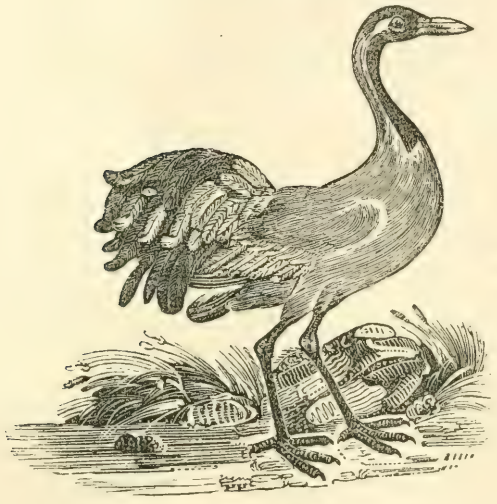
Lapwings are found in most parts of Europe, as far northward as Iceland. In the winter they are met with in Persia and Egypt. Their chief food is worms; and sometimes they may be seen in flocks nearly covering the low marshy grounds in search of these, which they draw with great dexterity from their holes. When the bird meets with one of those little clusters of pellets, or rolls of earth that are thrown out by the worm's perforations, it first gently removes the mould from the mouth of the hole, then strikes the ground at the side with its foot, and attentively waits the issue; alarmed by the shock, the reptile emerges from its retreat, and is instantly seized. In the evening they adopt another mode. They then run along the grass, and feel with their feet the worms which the dampness of the atmosphere has brought forth



These birds make a great noise with their wings in flying, and are called peewits, or tewits, in the north of England, from their particular cry. They remain there the whole year. The female lays two eggs on the dry ground, near some marsh, upon a little bed which she prepares of dry grass. These are olive-colored, and spotted with black. She sits about three weeks; and the young, who are covered with a thick down, are able to run within two or three days after they are hatched. The parent displays the fondest attachment to them, and employs innumerable interesting stratagems to avert approaching danger from them. "She does not wait the arrival of her enemies to the nest, but boldly pushes out to meet them. When she has approached as near as she dare venture, she rises from the ground with a loud screaming voice, as if just flushed from hatching, though probably she is not at the time within a hundred yards of her nest. She now flies with great clamor and apparent anxiety; winding and screaming round the invaders, striking at them with her wings, and sometimes fluttering as if she was wounded. To complete the deception, she becomes still more clamo-

rous as she retires from the nest. If very near, she appears altogether unconcerned; and her cries cease in proportion as her fears are augmented. When approached by dogs, she flies heavily, at a little distance before them, as if maimed; still vociferous, and still bold, but never offering to move towards the quarter where her young ones are stationed. The dogs pursue, in expectation every moment of seizing the parent, and by this means actually lose the offspring; for the cunning bird, having thus drawn them off to a proper distance, exerts her powers, and leaves her astonished pursuers to gaze at the rapidity of her flight." The lapwing may be domesticated, and it then becomes uncommonly familiar and confiding.

THE CRANE[1]



Is a tall, slender bird, with a long neck and long legs. The top of the head is covered with black bristles, and the back of it is bald and red, which sufficiently distinguishes this bird from the stork, to which it is very nearly allied in size and figure. The plumage, in general, is ash colored; and there are two large tufts of feathers that spring from the pinion of each wing.

[1] *Grus cinerea*, Bechst. The genus *Grus* has the bill as long as, or longer than the head, strong, straight, compressed, obtuse towards the tip; lateral base of the mandible deeply sulcated; ridge elevated; nostrils in the middle of the bill closed behind by a membrane; region of the eyes and base of the bill naked and papillous, or covered with feathers; legs long, with a large naked space above the knees; the middle fore toe united to the outer by a rudimentary membrane, the inner divided; hind toe articulated higher on the tarsus.

These, which bear a resemblance to hair, and are finely curled at the ends the bird has a power of erecting and depressing at pleasure. Gesner says, that these feathers, in his time, used to be set in gold, and worn as ornaments in caps.

The crane is a very social bird, and they are seldom seen alone. Their usual mode of flying or sitting is in flocks of fifty or sixty together; and while a part feed, the rest stand like sentinels upon duty. It for the most part subsists upon vegetables, and is known in every country of Europe, except England. As they are birds of passage, they are seen to depart and return regularly at those seasons when their provision invites or repels them. They generally leave Europe about the latter end of autumn, and return in the beginning of summer. In the inland parts of the continent, they are seen crossing the country, in flocks of fifty or a hundred, making from the northern regions towards the south. In these migrations, however, they are not so resolutely bent upon going forward, but that, if a field of corn offers in their way, they will stop a while to regale upon it; on such occasions they do incredible damage, chiefly in the night; and the husbandman, who lies down in joyful expectation, rises in the morning to see his fields laid entirely waste, by an enemy whose march is too swift for his vengeance to overtake.

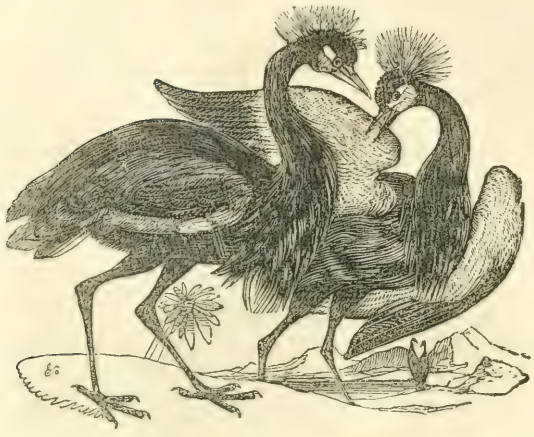
The cold arctic region seems to be this bird's favorite abode. They come down into the more southern parts of Europe, rather as visitants than inhabitants.

In their journeys, it is amazing to conceive the heights to which they ascend when they fly. Their note is the loudest of all birds; and is often heard in the clouds, when the bird itself is entirely unseen. As it is light for its size, and spreads a large expanse of wing, it is capable of floating, at the greatest heights, where the air is lightest; and as it secures its safety, and is entirely out of the reach of man, it flies in tracks which would be too fatiguing for any other birds to move forward in.

In these aerial journeys, though unseen themselves, they have the distinctest vision of every object below. They govern and direct their flight by their cries; and exhort each other to proceed or descend, when a fit opportunity offers for depredation. As they rise but heavily, they are very shy birds, and seldom let the fowler approach them. Corn is their favorite food; but there is scarcely any other that comes amiss to them. Redi, who opened several, found the stomach of one full of the herb called dandelion; that of another was filled with beans; a third had a great quantity of clover in its stomach; while those of two others were filled with earth-worms and beetles; in some he found lizards and sea-fish; in others, snails, grass, and pebbles, swallowed perhaps for medicinal purposes.

In general, it is a peaceful bird, both in its own society, and with respect to those of the forest. It is an animal easily tamed.

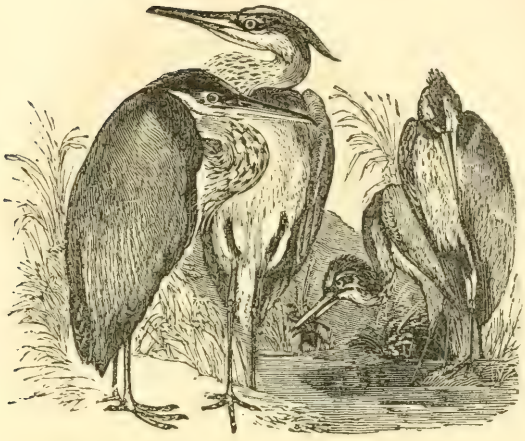
THE BALEARIC CRANE,[1]



For a long time continued unknown, till we became acquainted with the birds of tropical climates, when one of the crane kind with a topping was brought into Europe, and described by Aldrovandus as Pliny's balearic crane. It is remarkable for the lightness and elegance of its proportions, and the gracefulness and variety of its attitudes. Its forehead is covered by a thick tuft of short velvety feathers of a soft and brilliant black. The bill and legs are of the same hue. The long, slender feathers, descending on the neck, and the broader ones with which the upper and under surface of its body are clothed, are black, with a slight tinge of lead color; the primary wing feathers are black; the secondary, reddish brown; the wing-coverts white. The naked cheeks and temples are of a delicate rose color; and the yellow filaments of its crest terminate in blackish pencils. This bird comes from the coast of Africa and the Cape de Verd Islands. It grows to the height of four feet. As it runs, it stretches out its wings, and goes very swiftly, otherwise its usual motion is very slow. In their domestic state, they walk very deliberately among other poultry, and suffer themselves to be approached by every spectator. They never roost in houses; but about night, when they are disposed to go to rest, they search out some high wall, on which they perch in the manner of a peacock. Indeed, they so much resemble that bird in manners and disposition, that some have described them by the name of the sea peacock. But though their voice and roosting be similar, their food, which is entirely greens, vegetables, and barley, seems to make some difference.

[1] *Grus pavonina*, Temm.

THE HERON.[1]



The common heron is remarkably light in proportion to its bulk, scarcely weighing three pounds and a half, yet it expands a breadth of wing which s five feet from tip to tip. Its bill is very long, being five inches from the point to the base; its claws are long, sharp, and the middlemost toothed like a saw. Yet, thus armed as it appears for war, it is indolent and cowardly, and flies even at the approach of a sparrow-hawk. When driven to extremity, however, it shakes off its timidity, and displays both courage and skill. When its antagonist succeeds in rising above it, which is not easily done, the heron doubles his neck backward under his wing, and turns his bill upward, like a bayonet. In this manner, he sometimes contrives to transfix even the powerful sea eagle.

Of all birds, this commits the greatest devastation in fresh water; and there is scarcely a fish, though ever so large, that he will not strike at and wound, though unable to carry it away. But the smaller fry are his chief subsistence; these, pursued by their larger fellows of the deep, are obliged to take refuge in shallow waters, where they find the heron a still more formidable enemy. His method is to wade as far as he can go into the water, and there patiently wait the approach of his prey, which, when it comes

[1] *Ardea cinerea*, Lath. The genus *Ardea* has the bill as long as, or longer, than the head, strong, straight, compressed, pointed; upper mandible slightly sulcated, ridge rounded; nostrils lateral, placed almost at the base of the bill, longitudinally cleft in a groove, and half closed by a membrane; orbits and lores naked; legs long and slender, with a naked space above the knee; the middle toe connected with the outer by a short membrane; claws long, compressed, that of the middle toe dentated interiorly.

within sight, he darts upon with an inevitable aim. In this manner he is found to destroy more in a week than an otter in three months. "I have seen a heron," says Willoughby, "that had been shot, which had seventeen carps in his belly at once, which he will digest in six or seven hours. I have seen a carp," continues he, "taken out of a heron's belly, nine inches and a half long. Several gentlemen who kept tame herons, to try what quantity one of them would eat in a day, have put several smaller roach and dace in a tub; and they have found him eat fifty in a day, one day with another. In this manner a single heron will destroy fifteen thousand carp in a single half year."

But though in seasons of fine weather the heron can always find a plentiful supply, in cold or stormy seasons his prey is no longer within reach; the fish that before came into shallow water now keep in the deep, as they find it to be the warmest situation. Frogs and lizards, also, seldom venture from their lurking places; and the heron is obliged to support himself upon his long habits of patience, and even to take up the weeds that grow upon the water. At those times he contracts a consumptive disposition, which succeeding plenty is not able to remove; so that the meagre glutton spends his time between want and riot, and feels alternately the extremes of famine and excess. Hence, notwithstanding the ease with which he takes his prey, and the amazing quantity he devours, the heron is always lean and emaciated; and though his crop be usually found full, yet his flesh is scarce sufficient to cover the bones.

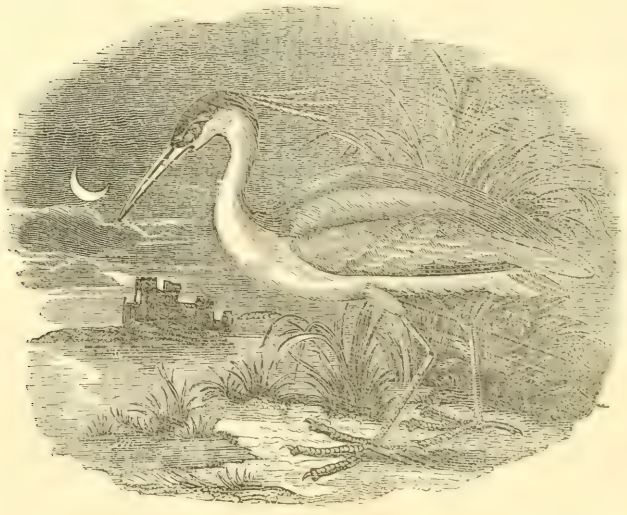
Though this bird lives chiefly among pools and marshes, yet its nest is built on the top of the highest trees, and sometimes on cliffs hanging over the sea. They are never in flocks when they fish, committing their depredations in solitude and silence; but in making their nests they love each other's society; and they are seen, like rooks, building in company with flocks of their kind. Their nests are made of sticks, and lined with wool; and the female lays four large eggs, of a pale color. The observable indolence of their nature, however, is not less seen in their nestling than in their habits of depredation. Nothing is more certain, and we have seen it a hundred times, than that they will not be at the trouble of building a nest when they can get one made by the rook, or deserted by the owl, already provided for them. This they usually enlarge and line within, driving off the original possessors, should they happen to renew their fruitless claims.

The heron is said to be a very long-lived bird; by Mr Keysler's account, it may exceed sixty years; and by a recent instance of one that was taken in Holland, by a hawk belonging to the Stadtholder, its longevity is again confirmed, the bird having a silver plate fastened to one leg, with an inscription, importing that it had been struck by the elector of Cologne's hawks thirty-five years before.

THE LITTLE EGRET[1]

Is the size of a fowl. The hind head is crested, and two of the feathers, which are five inches in length, hang gracefully behind. The whole plumage is of a beautiful white, and the elegance of the bird is much increased by the long, loose feathers which cover and hang over the rump; their flesh is said to be excellent. It is conjectured that both the crane and egret were formerly inhabitants of Great Britain; but this can hardly be said of them at present, notwithstanding a solitary instance or two of their having been shot there. In America there are egrets found of a reddish, and some of a black color; but they differ in no other respect from the European.

THE NIGHT HERON[2]



Is found in Europe and America. In the United States it is known by the name of qua bird, and breeds usually in the most solitary and deeply shaded parts of a cedar swamp. The males regularly direct their course every evening at twilight towards the marshes, uttering in a hoarse and hollow tone, the sound *qua*. At this hour, also, all the nurseries in the swamps are

[1] *Ardea garzetta*, Lin.

[2] *Ardea nycticorax*, Lin.

emptied of their inhabitants, who disperse in quest of food. On entering one of these swamps, the noise of the old and young would almost lead one to suppose that two or three hundred Indians were choking each other. The instant an intruder is discovered, the whole rise in the air in silence, and remove to the tops of the trees, in another part of the woods; while parties of from eight to ten make occasional circuits over the spot to see what is going on.

The food of the night heron, or qua bird, is chiefly composed of small fish, which it takes at night.

THE GREAT EGRET HERON[1]

Is often seen in summer in our low marshes and inundated meadows; yet, on account of its extreme vigilance, it is very difficult to be procured. It is found from Guiana, and probably beyond the line, to New York. It enters the territories of the United States late in February. The high inland parts of the country it rarely or never visits. Its favorite haunts are vast inundated swamps, rice fields, the low marshy shores of rivers, and such like places; where, from its size and color, it is very conspicuous even at a distance. The food consists of frogs, lizards, small fish, insects, and small water snakes, &c. They will also devour mice and moles. The plumage of this elegant bird is of a snowy whiteness; the bill of a rich orange yellow; and the legs black.

THE GREAT HERON[2]

Is a constant inhabitant of the Atlantic coast, from New York to Florida. They breed in the Carolinas and New Jersey, in the gloomy solitudes of cedar swamps, where, if unmolested, they will annually breed for many years. Their nests are constructed on the tallest trees. These are large, formed of sticks; each occupies the top of a single tree. The principal food of this bird is fish, for which he watches with unwearied patience, and seizes them with surprising dexterity. At the edge of a river, pond, or seashore, he stands fixed and motionless. But his stroke is as sure as fate to the first fish that comes in his way. He is also an excellent mouser, and feeds eagerly on grasshoppers and various winged insects.

The heron has great powers of wing, flying sometimes very high, and to a

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[1] *Ardea egretta*, Wilson. [2] *Ardea Herodias*, Lin.

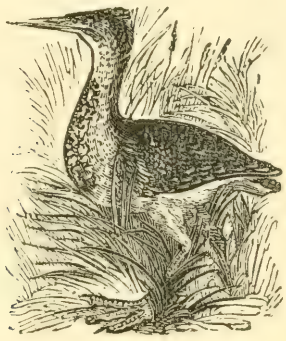
great distance; his neck doubled, his head drawn in, and his long legs stretched out in a long line behind him, appearing like a tail, and probably serving the same rudder-like office.

THE BLUE HERON[1]

Is properly a native of the warmer climates of the United States, migrating thence in winter to the tropical regions; being found in Cayenne, Jamaica, and Mexico. On the muddy shores of the Mississippi, these birds are frequently met with. Though in the northern states they are found chiefly in the neighborhood of the ocean, they are yet particularly fond of fresh water bogs on the edges of the salt marsh. These it often frequents, wading about in search of tadpoles, lizards, various larvæ of winged insects, and mud worms. It moves actively about in search of these, sometimes making a run at its prey, and is often seen in company with the little white heron.

There are also found in the United States, the little white heron, the green heron, the Louisiana heron, and the yellow-crowned heron.

THE BITTERN.[2]



Those who have walked in an evening, by the sedgy sides of unfrequented rivers, must remember a variety of notes from different waterfowls. But of all those sounds, there is none so dismally hollow as the booming of the

[1] *Ardea cœrulea*, Lin.

[2] *Ardea stellaris*, Lin.

bittern. It is impossible for words to give those who have not heard this evening call, an adequate idea of its solemnity. It is like the interrupted bellowing of a bull, but hollower and louder, and is heard at a mile's distance, as if issuing from some formidable being that resided at the bottom of the waters.

The bird, however, that produces this terrifying sound is not so big as a heron, with a weaker bill, and not above four inches long. It differs from the heron chiefly in its color, which is, in general, of a palish yellow, spotted and barred with black. Its windpipe is fitted to produce the sound for which it is remarkable; the lower part of it dividing into the lungs, is supplied with a thin loose membrane, that can be filled with a large body of air, and exploded at pleasure. These bellowing explosions are chiefly heard from the beginning of spring to the end of autumn; and, however awful they may seem to us, are the calls to courtship, or connubial felicity.

This bird, though of the heron kind, is yet neither so destructive, nor so voracious. It is a retired, timorous animal, concealing itself in the midst of reeds and marshy places, and living upon frogs, insects, and vegetables; and though so nearly resembling the heron in figure, yet differing much in manners and appetites. It lays its eggs in a sedgy margin, or amidst a tuft of rushes, and composes its simple habitation of sedges, the leaves of water-plants, and dry rushes. It lays generally seven or eight eggs of an ash-green color, and in three days leads its little ones to their food. The bitterns defend their young with such courage, that even the hawk does not often venture to attack their nest.

At the latter end of autumn, however, in the evening, the wonted indolence of the bittern appears to forsake it. It is seen rising in a spiral ascent till it is quite lost from the view, and makes at the same time a singular noise, very different from its former boomings.

The flesh of the bittern is greatly in esteem among the luxurious. For this reason, it is as eagerly sought after by the fowler as it is shunned by the peasant; and as it is a heavy rising, slow-winged bird, it does not often escape him. Indeed, it seldom rises but when almost trod upon; and seems to seek protection rather from concealment than flight.

When wounded by a sportsman, this bird often makes severe resistance. It does not retire; but waits the onset, and gives such vigorous pushes with its bill, as to wound the leg through the boot. Sometimes it turns on its back, like the rapacious birds, and fights with both its bill and claws. When surprised by a dog, it is said always to throw itself into this posture and defend itself so vigorously, as to compel the assailant to retire. The eyes of its antagonist are the object at which it chiefly strikes.

THE AMERICAN BITTERN[1]

Is common to all our sea and river marshes, though no where numerous; it rests all day among the reeds and rushes, and, unless disturbed, feeds and flies only during the night. In some places it is called the Indian hen. On the seacoast of New Jersey, it is known by the name of dunkadoo, a word probably imitative of its note. It utters sometimes a hollow guttural note, among the reeds; but has nothing of that long booming sound for which the European bittern is so remarkable. When disturbed, they rise with a hollow *kwa*, and are then easily shot down, as they fly heavily. Like most other night birds, their sight is most acute during the evening twilight; but their hearing is at all times exquisite. They make their nests in swamps, laying four eggs in the long grass.

THE LEAST BITTERN[2]

Is the smallest known species of the whole tribe. It is commonly found in fresh water meadows, and rarely visits the salt marshes. In the meadows of Schuylkill and Delaware below Philadelphia, a few of these birds breed every year; making their nests in the thick tussocks of grass in swampy places. When alarmed they seldom fly far, but take shelter among the reeds or long grass. They are scarcely ever seen exposed, but skulk during the whole day; and, like the preceding species, feed chiefly at night. This little creature measures but twelve inches in length.

THE STORK.[3]

The most remarkable of this tribe is the white stork, the length of which is about three feet. The bill is nearly eight inches long, and of a fine red color. The plumage is wholly white, except the orbits of the eyes, which are bare and blackish; some of the feathers on the side of the back and on the wings are black. The skin, the legs, and the bare parts of the thighs are red.

The white stork is semi-domestic; haunting towns and cities, and in many places stalking unconcernedly about the streets, in search of offal and

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[1] *Ardea minor*, Wilson. [2] *Ardea exilis*, Gmel.

[3] *Ciconia alba*, Bellon. The genus *Ciconia* has the bill long, straight, stout, cylindrical, in the form of an elongated pointed cone; ridge rounded, of equal height with the head; under mandible slightly bent upwards; nostrils longitudinally cleft in a groove of the horny substance; eyes surrounded with a naked space; legs long; the three anterior toes united to the first joint, the hind toe jointed on the same level as the others; wings of moderate size.

other food. They remove the noxious filth, and clear the fields of serpents and reptiles. On this account they are protected in Holland, held in high veneration by the Mahometans; and so greatly were they respected in times of old by the Thessalonians, that to kill one of these birds was a crime expiable only by death. The ancients, indeed, ascribed to it the virtues of temperance, conjugal fidelity, and filial and paternal piety.

The disposition of this bird is mild, neither shy nor savage; it is easily tamed, and may be trained to reside in gardens, which it will clear of insects and reptiles. It has a grave air and a mournful visage; yet when roused by example, it shows a certain degree of gaiety; for it joins in the frolics of children, by imitating them. Dr Herman tells us, that he saw a

tame one in a garden, where the children were playing at hide and seek, and that it run its turn when touched, and so well distinguished the child whose turn it was to pursue the rest, as to be perfectly on its guard. Nor do they lightly feel or inadequately revenge an injury. A wild stork, having been beaten by a tame one, has been known, after an interval of four months, to come back with three other storks, and kill the former victor.

Storks are birds of passage, and observe great exactness in the time of their autumnal departure from Europe to more favorite climates. They are seldom seen farther north than Sweden; and though they have scarcely ever been met with in England, they are so common in Holland as to build every where on the tops of the houses, where the inhabitants provide boxes for them to make their nests in, and are careful that the birds suffer no injury

always resenting this as an offence committed against themselves. Storks are also common at Aleppo, and in plenty at Seville, in Spain. At Bagdad, hundreds are said to be seen about the houses, walls, and trees; and at Persepolis, or Chilmanar, in Persia, the remains of the pillars serve them to build on, every pillar having a nest on it.

This bird bestows much time and care on the education of its young, and does not leave them till they have strength sufficient for defence and support. When they begin to flutter out of the nest, the mother bears them on her wings; she protects them from danger, and will sometimes perish rather than forsake them.

In autumn they retire into Egypt, and the marshes of Barbary, where they enjoy a second summer, and bring up a second brood. Their migration is performed in immense companies. Dr Shaw saw passing over Mount Carmel three flocks of them, each of which was half a mile in width, and they were three hours in going by. Bellonius informs us, that storks visit Egypt in such abundance, that the fields and meadows are white with them, and that the natives are pleased with their arrival, as the birds deliver them from innumerable swarms of frogs, and also devour serpents. Between Belbeis and Gaza, in Palestine, they perform a similar service, by destroying innumerable rats and mice.

In the northern countries of Europe there are storks, of which the plumage is black.

MARABOU STORK.[1]

The marabou stork appears to inhabit nearly the whole of tropical Africa, extending southward, according to M. Temmick, to the neighborhood of the Cape of Good Hope, where, however, it is by no means common. M. Rüppel observed it on the banks of the Nile, Major Denham in the neighborhood of the large towns in the interior, and Smeathman on the western coast. The plumes imported into Europe are brought chiefly from Senegal. In its habits this bird bears a close resemblance to the white stork of Europe, but becomes still more familiar, and, in consequence of its larger size, renders more essential service in the removal of carrion, offal, and other nuisances. This important office, like the adjutants of Calcutta, it shares with the vultures; and both birds are universally privileged from all annoyance, in return for so meritorious exertion of their natural propensities. They seem to be constantly attracted by the heaps of offensive substances collected in the villages and towns, which they devour without scruple, and in immense quantities. The mode in which the Indian bird performs the

[1] *Ciconia marabou*, Temm.

functions of a scavenger has been repeatedly described by travellers and Major Denham mentions his having frequently been a witness of the voracious and omnivorous habits of the African. Nothing seems to come amiss to its voracious appetite, for when carrion is scarce, it attacks reptiles, small birds, and even the lesser quadrupeds, which it usually swallows entire.

These birds are so peaceable in their manners, and so inclined to become familiar, that there is little difficulty in taming them. Dr Latham gives an amusing account, derived from Smeathman, of the behavior of a young individual, which had been brought up in a state of domestication in the part of Africa where that traveller resided. This bird always took its place at dinner time, in the great hall, behind its master's chair, where it remained

in expectation of its usual share in the meal. The servants had some difficulty in protecting the dishes from its attacks previously to the arrival of the guests; they carried switches for the purpose, but it would frequently watch its opportunity and snatch some favorite morsel before they were aware of it. In this way it had been known to swallow an entire boiled fowl at a single mouthful. It was permitted to fly at large about the island, and roosted very high among the silk-cotton trees, from the tops of which, even

at the distance of two or three miles, it would espy the servants carrying the dishes across the yard, and dash down among them as they entered the hall.

The attitudes of these birds are particularly curious, and frequently not a little ludicrous. At rest, they either stand upon one leg, with the neck withdrawn and the bill brought forwards towards the breast, or sit upon the ground with one or both legs directed straight before them. But when excited, they elongate their necks, and stand at their full height, menacing with their large bills, which are, however, too light to inflict any serious injury, even had the birds courage enough to attempt it.

THE FLAMINGO[2]

Is, perhaps, the most remarkable of water-fowl; it is one of the tallest and the most beautiful. The body, which is of a beautiful scarlet, is no bigger than that of a swan; but its legs and neck are of such an extraordinary length, that when it stands erect, it is six feet six inches high. Its wings, extended, are five feet six inches from tip to tip; and it is four feet eight inches from tip to tail. The head is round and small, with a large bill, seven inches long, partly red, partly black, and crooked like a bow. The legs and thighs, which are not much thicker than a man's finger, are about two feet eight inches high; and its neck near three feet long. The feet are feeble, and united by membranes, as in those of the goose. Of what use these membranes are does not appear, as the bird is never seen swimming, its legs and thighs being sufficient to bear it into those depths where it seeks for prey.

This extraordinary bird is now chiefly found in America, but was once known on all the coasts of Europe. It is still occasionally met with on the shores of the Mediterranean. Its beauty, its size, and the peculiar delicacy of its flesh, have been such temptations to destroy or take it, that it has long since deserted the shores frequented by man, and taken refuge in countries that are as yet but thinly peopled.

When the Europeans first came to America, and coasted down along the African shores, they found the flamingos on several shores on either continent gentle, and no way distrustful of mankind. When the fowler had killed one, the rest of the flock, far from attempting to fly, only regarded the fall of their companion in a kind of fixed astonishment; another and another shot was discharged; and thus the fowler often levelled the whole flock, before one of them began to think of escaping.

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[1] *Phenicopterus ruber*, Lin. This is the only one of the genus. Its characteristics are a bill thick, strong, deeper than broad, dentated, naked at the base; upper mandible bent over the under at the tip; the under broader than the upper; nostrils longitudinal in the middle of the bill, covered by a membrane; legs very long, with three toes before, and a very short one articulated high on the tarsus behind; the fore toes connected with the claws; wings middle sized.

But at present it is very different in that part of the world; and the flamingo is not only one of the scarcest, but one of the shyest birds in the world, and the most difficult of approach. They chiefly keep near the most deserted and inhospitable shores; near salt water lakes and swampy islands. When seen by mariners in the day, they always appear drawn up in a long

close line of two or three hundred together; and, as Dampier tells us, present at the distance of half a mile, the exact representation of a long brick wall. This line, however, is broken when they seek for food; but they always appoint one of the number as a watch, whose only employment is to observe and give notice of danger while the rest are feeding. As soon as this trusty sentinel perceives the remotest appearance of danger, he gives a loud scream, with a voice as shrill as a trumpet, and instantly the whole cohort are upon the wing. The flesh of the old ones is black and hard, though, Dampier says, well tasted; that of the young ones is better. But, of all delicacies, the flamingo's tongue is the most celebrated. In fact, the Roman emperors considered them as the highest luxury; and we have an account of one of them, who procured fifteen hundred flamingos' tongues to be served up in a single dish The tongue of this bird, which was so

much sought after, is a good deal larger than that of any other bird whatever. The bill of the flamingo is like a large black box of an irregular figure, and filled with a tongue which is black and gristly.

Their time of breeding is according to the climate in which they reside; in North America they breed in summer; on the other side of the line, they take the most favorable season of the year. They build their nests in extensive marshes, and where they are in no danger of a surprise. The nest is not less curious than the animal that builds it: it is raised from the surface of the pool about a foot and a half, formed of mud scraped up together, and hardened by the sun, or the heat of the bird's body: it resembles a truncated cone, or one of the pots which we see placed on chimneys; on the top it is hollowed out to the shape of the bird, and in that cavity the female lays her eggs, without any lining but the well cemented mud that forms the sides of the building. She always lays two eggs, and no more; and, as her legs are immoderately long, she straddles on the nest, while her legs hang down, one on each side, into the water. The young ones are a long while before they are able to fly; but they run with amazing swiftness. They are sometimes caught; and, very different from old ones, suffer themselves to be carried home, and are tamed very easily.

THE AVOSET[1]

Is easily distinguished from all other birds by the form of its bill, which is very thin, slender, and bends considerably upwards. The scooping avoset is about the size of the lapwing, or eighteen inches long; the bill is three inches and a half in length. The top of the head is black, the rest of the head, neck, and all the other parts of the body white, except the inner scapulars, the middle of the wing-coverts and outer webs, and ends of the quills, which again are black. The legs are long, and of a bluish gray, and the toes have a connecting membrane. It weighs about thirteen ounces, and is frequent, in the winter, on most of the seacoasts of Europe, as well as in the fens of Lincolnshire, Cambridge, &c in England. It feeds on worms and insects, which it scoops out of the sand with its bill.

[1] *Recurvirostra avocetta*, Lin. The genus *Recurvirostra* has the bill very long, slender, feeble, depressed throughout its length, flexible and turned up at the point, the upper mandible channelled on its surface, the under laterally; nostrils linear and long; legs long and slender; the three fore toes united as far as the second joint by a membrane; the hind toe placed high up and very short; wings acuminate, the first quill longest.

AMERICAN AVOSET.[1]

This species, from its perpetual clamor and flippancy of tongue, is called by the inhabitants of Cape May, the lawyer. Wilson found these birds, as well as the long-legged avost, in the salt marshes of New Jersey on the 20th of May. They flew around the shallow pools, uttering the sharp note of *click, click*, alighting on the marsh, or in the water, fluttering their loose wings, and shaking their half-bent legs, as if ready to tumble over, keeping up a continual yelping note. The nest was built among the thick tufts of grass, of sea-weed, dry grass, and twigs, and raised to the height of several inches.

THE ROSEATE SPOONBILL.[2]

This stately and elegant bird inhabits the seashores of America from Brazil to Georgia. It also appears to wander up the Mississippi sometimes

[1] *Recurvirostra Americana*, Lath.

[2] *Platalea ajaja*, Lin. The genus *Platalea* has the bill very long, much flattened, dilated towards the extremity, and rounded like a spoon or spatula; upper mandible channeled and transversely sulcated at the base; nostrils approximated, oblong, open, bordered with a membrane; face and head wholly or partially naked; legs long; the three anterior toes connected to the second joint by deeply cut membranes; the hinder one long, and bearing on the ground.

in summer. It is however rarely seen to the northward of Altamaha river; and even along the peninsula of Florida is a rare bird; in Jamaica and several other of the West India islands, Mexico, and Guiana, it is more common, but confines itself chiefly to the seashore and the mouths of rivers. It wades about in quest of shell-fish, marine insects, small crabs, and fish. In pursuit of these, it occasionally swims and dives.

This bird is of a beautiful pink color, with a mixture of black at the lower part of the neck. The most common species, however, is that which bears the name of the white spoonbill,[1] from its plumage, save that in some rare exceptions it is entirely white. This bird is about the size of a heron, but somewhat shorter in the neck and legs. The bill is more than half a foot long, and has the shape of a spoon.

THE IBIS.[2]

The Egyptian ibis, so famous in history and mythology, is larger than the stork, measuring from thirty to forty inches in length. The bill is seven

[1] *Platalea nivea*, Cuv.

[2] *Ibis religiosa*, Cuv. The genus *Ibis* has the bill long, slender, arched, broad at the base, tip depressed, obtuse, and rounded; upper mandible deeply furrowed in its whole length; nostrils near the base at the upper part of the bill, oblong, straight and perforated in the membrane which covers the furrow; the face, and frequently a part of the head and neck, naked; legs naked above the knee; the fore toes united as far as the first joint; the hind toe long, and reaching the ground.

inches long, is slightly curved, and ends in a blunt point. The plumage is a reddish white, most inclining to red on the back and wings. It is found in great numbers in Lower Egypt, in places just freed from the inundations of the Nile, where it is of signal service in destroying insects, reptiles, &c. This bird is frequently found in the sepulchres along with the mummies, and was formerly held sacred by the Egyptians.

WOOD IBIS.[1]

This bird is found in the southern parts of the United States, and also extends as far as Cayenne, Brazil, and various parts of South America. Its favorite haunts are watery savannahs, and inland swamps, where it feeds on fish and reptiles. The French inhabitants of Louisiana esteem it good eating.

The following account is given by Mr William Bartram. "This solitary bird does not associate in flocks; but is generally seen alone, commonly near the banks of great rivers, in marshes or meadows, especially such as are covered by inundations, and also in vast deserted rice plantations. He stands alone, on the topmost limb of tall, dead cypress trees, his neck contracted or drawn in upon his shoulders, and his beak resting like a long scythe upon his breast; in this pensive posture and solitary situation, they look extremely grave, sorrowful, and melancholy, as if in the deepest thought. They are never seen on the seacoast, and yet are never found at a great distance from it. They feed on serpents, young alligators, frogs, and other reptiles."

The whole body, neck, and lower parts of this bird, are white; the bill is nearly nine inches long.

THE SCARLET IBIS.[2]

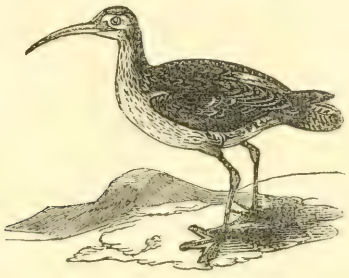
This beautiful bird is said to be common in most parts of America within the tropics, and in almost all the West India islands. Of its manners, little more has been collected, than that it frequents the borders of the sea, and shores of the neighboring rivers, feeding on small fry, shell-fish, sea-worms and crabs. It is said frequently to perch on trees, sometimes in large flocks out to lay its eggs on the ground, or a bed of leaves. The young whe

[1] *Ibis loculator*, Lin.

[2] *Ibis rubra*, Vieill.

hatched are black, soon after gray, then white, and gradually assume their red color; at the third year, their plumage is complete. They have frequently been domesticated.

THE CURLEW[1]



Is a well known bird, which in winter frequents seacoasts and marshes, feeding chiefly on frogs and marine insects. In summer they retire to the mountainous and unfrequented parts to breed. Their flesh is rank and fishy. Curlews differ much in size, some weighing thirty-seven ounces, and some not twenty-two; the length of the largest is twenty-five inches. Its bill is long, black, and much curved. The upper parts of the plumage are of a pale brown; the breast and belly white, marked with dark oblong spots. The female is somewhat larger than the male, which is commonly called the jack curlew, and the spots with which she is covered almost all over are more inclining to a red. Latham enumerates about eleven species, foreign and domestic.

THE SANDPIPER.[2]

Of the sandpiper, properly so called, there are about twelve species known in Europe, from the size of a thrush to that of a hedge-sparrow. The com-

[1] *Numenius arquata*, Lath. The genus *Numenius* has the bill long, slender, arched, compressed, point hard, and slightly obtuse; upper mandible projecting beyond the lower, rounded at the bud, and channelled through three fourths of its length; nostrils lateral, linear and pierced in the furrow; face feathered; legs slender; naked above the knee; the three fore toes united by a membrane to the first joint; the hinder articulated to the tarsus, and touching the ground.

[2] The genus *Tringa* or sandpiper, has the bill middle-sized or long, very slightly arched, curved or straight at the tip, soft and flexible through its whole length, compressed at the base, depressed, dilated, and obtuse at the point; both mandibles channelled to near their extremities; nostrils lateral, conical in the membrane which covers the nasal furrow; legs slender, naked above the knee; the three fore toes quite divided; but in a few species the middle and outer toe are connected by a membrane; the hinder articulated to the tarsus.

mon sandpiper, which is a solitary bird, is in weight about two ounces; the head is brown, streaked with black, the back and coverts brown, mixed with glossy green; the breast and belly pure white. Its note is louder and more piping than others of this genus. It frequents rivers, lakes, and meres, and is never found near the sea.

THE RED-BACKED SANDPIPER[1]

Inhabits both the old and new continents, being known in England by the name of Dunlin; and in the United States, along the shores of New Jersey, by the name of red-back. They frequent the muddy flats and shores of the salt marshes at low water, feeding on small worms and other insects which abound in such places. It has not till now been recognized by naturalists as inhabiting this part of North America.

THE SOLITARY SANDPIPER[2]

Inhabits the watery solitudes of our highest mountains during the summer, from Kentucky to New York, but is nowhere numerous, seldom more than one or two being seen together. It takes low, short flights; runs nimbly about among the mossy margins of mountain springs, brooks, and pools, occasionally stopping, looking at you, and perpetually nodding the head. It is so unsuspicious as to permit one to approach within a few yards of it, without appearing to take notice, or to be the least alarmed.

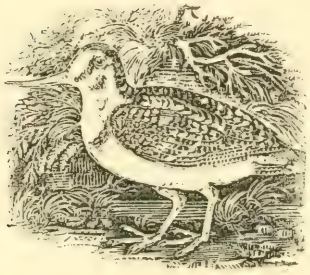
THE RED-BREASTED SANDPIPER[3]

Is commonly called the *gray back*, or *brown back*, on our seacoasts. It is a particular favorite among gunners, being generally a very plump, tender, and excellent bird for the table. They usually keep in small flocks, alight on the sand-flats in a close body, where they search for small bivalve shells. On the approach of the sportsman, they frequently stand fixed and silent for some time; do not appear to be easily alarmed, neither do they run about in the water as much as some others, or with the same rapidity, but appear more tranquil and deliberate. They retire to the south in November.

The other individuals of this family, both American and foreign, are too numerous to be particularized.

[1] *Tringa alpina*, Lin. [2] *Tringa solitaria*, Wilson. [3] *Tringa rufa*, Wilson.

THE WOODCOCK.[1]



The woodcock of the old continent inhabits and breeds in the northern regions during summer; but on the commencement of the frost, it begins to migrate southward. The greater part of them leave England at the close of February, or the beginning of March, after having paired; but they are sometimes detained for a while longer by the wind being adverse.

The woodcock is about as large as a pigeon, with a bill three inches long. The crown of the head and back of the neck are barred with black, and a black streak runs from the bill to the eyes. It flaps its wings with some noise when it rises, and its flight is pretty rapid, but neither high nor long and its descent is so sudden that it seems to fall like a stone. It flies very straight in a wood of tall trees, but in a copse it is often obliged to wind and frequently drops behind bushes, to conceal itself from the eye of the fowler. It principally feeds on worms and insects, which it draws out of the mud with its long bill; and its flesh is universally admired. The female builds a rude nest on the ground, and generally lays four or five eggs. She is remarkably tame during incubation.

THE AMERICAN WOODCOCK,[2]

In its general figure and habits, greatly resembles the woodcock of Europe, but is considerably less, and very differently marked. This bird is univer-

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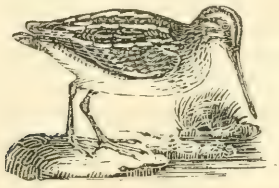
[1] *Scolopax rusticola*, Lin. The genus *Scolopax* has the bill long, straight, compressed, slender, soft, with the tip turned; both mandibles channelled the half of their length, the tip of the upper, projecting beyond that of the under, and the turned portion being hooked; nostrils lateral, basal, longitudinally cleft near the edges of the mandible, and covered by a membrane; legs slender, with a very small naked space above the knee; the three fore toes quite divided, or rarely the outer and middle united.

[2] *Scolopax minor*, Wilson.

sally known to our sportsmen. During the day they keep to the woods and thickets, and at the approach of evening seek the springs and open watery places to feed in. They soon disperse themselves over the country, to breed. In the hot weather, they descend to the marshy shores of our rivers, their favorite springs and watery recesses inland, being chiefly dried up. To the former of these retreats they are pursued by the merciless sportsmen, flushed by dogs, and shot down in great numbers. The woodcock is properly a nocturnal bird, feeding chiefly at night, and seldom stirring about till after sunset; at such times he rises by a kind of spiral course to a considerable height in the air, uttering at times, a sudden quack, till having gained his utmost height, he hovers round in a wild, irregular manner, making a sort of murmuring sound, then descends with rapidity as he rose. When uttering his note on the ground, he seems to do it with difficulty, throwing his head towards the earth, and frequently jetting up his tail. Their food consists of larvæ and other aquatic worms, for which, during the evening, they are almost continually turning over the leaves with their bill, or searching in the bogs. Their flesh is reckoned delicious and prized highly.

The head of the woodcock is of singular conformation, and the eye is fixed at a remarkable distance from the bill, and high in the head. This construction was necessary to give a greater range of vision, and to secure the eye from injury, while the owner is searching in the mire. The flight of this bird is slow.

THE SNIPE.[1]



Snipes are migratory birds, which are supposed to breed chiefly in the lower lands of Germany and Switzerland. They visit England in autumn, and retire in the spring. Many, however, remain there the whole year, and make their nests of dried grass and feathers, in the most inaccessible parts of marshes. Our common snipe, usually called the English snipe, differs but little, if at all, from the European snipe. They are most difficult to shoot, of all our birds, as they fly very rapidly, in zigzag lines. They

[1] *Scolopax gallinago*, Lin.

are very eagerly sought after by our gunners. Their food consists of small worms, slugs, and the larvæ of insects. During the breeding season, while it plays over the moors, this bird makes a pleasing, humming, and piping sound. Their flesh is justly reckoned among feathered dainties.

From the point of the bill, to the end of the tail, the snipe measures about twelve inches, and from the point of each wing, when extended, about fifteen or sixteen; the head is divided longwise by a pale red line, parallel to which on each side, is a black line, and over the eyes there runs another line pretty much of the same color as that on the middle of the head. The feathers that spring from the shoulders reach almost as far as the end of the tail, the outward half from the shaft being of a pale red.

THE WILLET, OR SEMIPALMATED SNIPE,[1]

Is peculiar to America, and is one of the most noisy and noted birds that inhabit our salt marshes in summer. Its common food is *willet*. It arrives from the south on the shores of the middle states, about the beginning of May; and from that time till the last of July, its loud and shrill reiterations of *pill-will-willet*, *pill-will-willet*, resound almost incessantly along the marshes, and may be distinctly heard at the distance of more than a mile Their nests are built on the ground among the grass of the marshes, and are composed of wet rushes and coarse grass.

The anxiety and affection manifested by this bird for its eggs and young, are truly interesting. A person no sooner enters the marshes, than he is beset by the willets flying around and skimming over his head, vociferating with great violence their common cry of *pill-will-willet;* and uttering at times a loud clicking note as he approaches nearer to their nest. As they occasionally alight, and slowly shut their long white wings speckled with black, they have a mournful note, expressive of great tenderness. They chiefly subsist on small shell-fish, marine worms, and aquatic insects. They have a summer and also a winter dress, in its colors differing so much in these seasons, as scarcely to be known as the same species.

There are other individuals of this tribe, common in the United States, which we have not room to describe.

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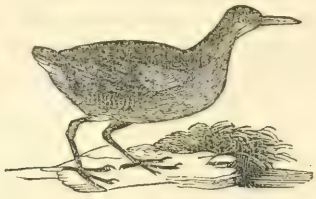
[1] *Scolopax semipalmata*, Wilson.

THE WATER RAIL, OR OUZEL,[1]



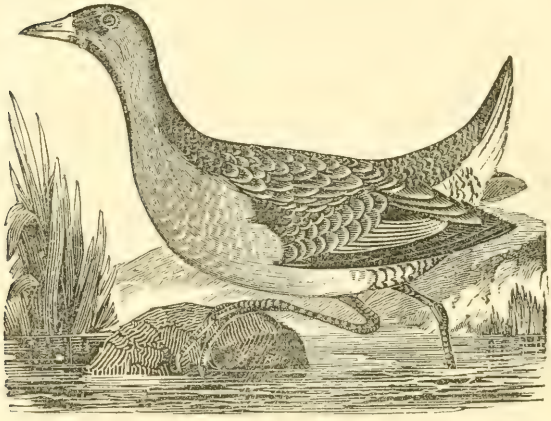
Is a bird well known in the British islands. It is a large slender bird, with a black bill, one inch and three quarters long. Its weight is four ounces and a half. The upper parts of the plumage are black, edged with olive brown, the lower parts ash colored. This bird frequents the banks of springs or brooks, which it never leaves; preferring the limpid streams, whose fall is rapid, and whose bed is broken with stones and fragments of rocks. The habits of the water ouzel are very singular. Aquatic birds, with palmated feet, swim or dive; those which inhabit the shores, without wetting their body, wade with their tall legs; but the water ouzel, which, it must be remembered, is neither a wader nor a diver, but one of the passerine birds, walks quite into the flood, following the declivity of the ground. It is observed to enter by degrees, till the water reaches its neck; and it still advances, holding its head not higher tnan usual, though completely immersed. It continues to walk under the water; and even descends to the bottom, where it saunters as on dry land. M. Herbert, who watched one immersing itself in the lake of Nantua, and who communicated the fact to M. de Buffon, says, "I perceived several times, that as often as it waded deeper than the knee, it displayed its wings, and allowed them to hang to the ground. I remarked, too, that, when I could discern it at the bottom of the water, it appeared enveloped with air, which gave it a brilliant surface, like that on some sorts of beetles, which in water are always inclosed in a bubble of air. Its view, in dropping its wings on entering the water, might be to confine this air, it was certainly never without some, and it seemed to quiver." It is a curious fact, that even the young ones, before they are quite feathered, are able to make their way under water, the same as the older birds.

These birds are found in many parts of Europe. The female makes her nest on the ground, in some mossy bank near the water, of hay and dried fibres, lining it with dry oak leaves, and forming to it a portico or entrance

[1] *Rallus aquaticus*, Lin. The genus *Rallus* has the bill longer than the head, slender slightly arched, or straight, compressed at the base, cylindrical at the tip; upper mandible channelled; nostrils lateral, longitudinally cleft in the furrow, half closed by a membrane; legs long and stout, with a small naked spur above the knee; the three anterior toes divided; the posterior articulated on the tarsus; wings rounded, the third and fourth feathers longest.

of moss. The nest is in its color so closely similar to that of the surrounding objects, that it is almost impossible to discover it except when the bird is entering. The eggs are five in number; white, tinged with a fine blush of red. It will sometimes pick up insects at the edge of the water. When disturbed, it usually flirts up its tail, and makes a chirping noise. Its song in spring is said to be very pretty. In some places it is supposed to be migratory.

THE AMERICAN RAIL[1]



Affords the sportsman a most agreeable amusement, and a delicious repast. In Virginia, it is called sora, and in South Carolina, the coot. Its history is involved in profound mystery. No one can detect the first moment of arrival; yet, all at once, the reedy shores, and grassy marshes of our large rivers, swarm with them, thousands of them being sometimes found within the space of a few acres. These, when they do venture on the wing, seem to fly so feebly, and in such short fluttering flights among the reeds, as to render it highly improbable to most people that they could possibly make their way over an extensive country. Yet on the first smart frost that occurs, the whole suddenly disappear, as if they had never been.

When the reeds along the shores of the Delaware have attained their full growth, the rail resort to them in great numbers to feed on the seeds of this plant, of which they are immoderately fond. As you walk along the em-

[1] *Rallus carolinus*, Lin.

bankment of the river at this season, you hear them squeaking in every direction like young puppies; if a stone be thrown among the reeds, there is a general outcry, and a reiterated *kuk, kuk, kuk*, something like that of a guinea fowl. Any sudden noise, or the discharge of a gun, produces the same effect. In the mean time, none are to be seen, unless it be at high water; for when the tide is low, they universally secrete themselves among the reeds, and you may walk past and even over them, without seeing a single individual. Their flight through the reeds is exceedingly low; and shelter being abundant, is rarely extended far. They swim and dive with great rapidity, and sometimes when wounded, they dive, and rising under the gunwale of the boat, secrete themselves there, moving round as the boat moves, until they have an opportunity of escaping unnoticed. They are feeble and delicate in every thing but the legs, which seem to possess great vigor and energy, and their bodies being so remarkably thin, as to be less than an inch and a quarter through transversely, they are enabled to pass between the reeds like rats. When seen, they are almost constantly getting up the tail.

These birds are also numerous near Detroit, in the lagoons, where another species of reed grows of which they are fond. In New Jersey, where there are no reeds, they are never to be found; but wherever the reeds are, there the rails are sure to be in great numbers.

In the United States are also found, the *Virginian rail* and the *clapper rail.*

ORDER XIV.—PINNATIPEDES.

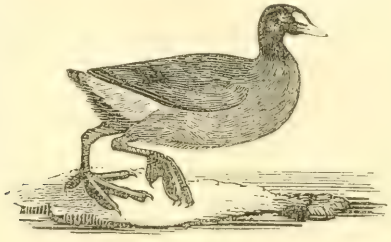
Birds of this order have the bill middle-sized and straight; upper mandible slightly curved at the tip; legs of medium size; tarsi slender or compressed; three toes before and one behind, with rudiments of webs along the toes; hind toe articulated interiorly on the tarsus.

THE COOT[1]

Is a well known bird. It weighs from twenty-four to twenty-eight ounces Wilson is inclined to believe that the American coot is a different species from the European, from the circumstance that the membrane in the former is of a chesnut color, instead of white; though in other respects they seem to be the same. In Pennsylvania it is called the mud-hen. The bald part

[1] *Fulica atra*, Lin. The genus *Fulica* has the bill middle-sized, strong, conical, broad at the base; the ridge projecting in front, and dilated into a naked plate; both mandibles of the same length, the upper slightly curved, and reduced at the base, the lower forming an angle; nostrils lateral, in the middle of the bill, longitudinally cleft, half closed by a membrane; legs long, slender, naked above the knee; all the toes very long, connected at their base, and furnished along their sides with scalloped membranes.

of the head, which in the water-hen is red, in the coot is white. The upper parts of its plumage are black, the breast and belly white. As the coot is a larger bird than the water-hen, which it much resembles, it is always seen in larger streams, and more remote from mankind. It there makes a nest of such weeds as the stream supplies, and lays them among the reeds, floating on the surface, and rising and falling with the water. The reeds among which it is built keep it fast, so that it is seldom washed into the middle of the stream. But if this happens, which is sometimes the case, the bird sits



in her nest, like a mariner in his boat, and steers, with her legs, her cargo into the nearest harbor; there, having attained her port, she continues to sit in great tranquillity, regardless of the impetuosity of the current; and, though the water penetrates her nest, she hatches her eggs in that wet condition. The coot is by no means a rare bird in Britain, where it resides permanently, though with the seasons it changes its residence. It is rather a timid bird, very inert, and feeds in the evening, upon fishes, insects, seeds, and herbage. In Madagascar there is a coot with a red comb like a cock.

THE CRESTED GREBE.[1]

This bird is about the size of a duck. Its bill, that part especially towards the head, is of a reddish color, and is somewhat more than two inches in length. On the top of the head and neck is a beautiful crest of feathers, those on the neck appearing like a collar or ruff, and seeming a good deal bigger than they really are; those on the top of the head are black, those on the sides of the neck are of a reddish or cinereous color; the back

[1] *Podiceps cristatus*, Lath. The genus *Podiceps* has the bill middle size, straight, hard, compressed, in the form of an elongated and pointed cone; tip of the upper mandible slightly inclined; nostrils lateral, concave, oblong, closed behind by a membrane, open in front, and pervious; legs long, placed far backwards; tarsi much compressed; fore toes much depressed, connected at their base, and furnished with a simple lobe; hind toe compressed and scalloped; claws broad, much depressed; no tail; wings short.

and wings are of a darkish brown, pretty much inclining to black, except some of the exterior edges of the wing feathers, which are white. The

breast and belly are of a light ash color; it has no tail; the legs and toes are broad and flat. It has an unpleasant cry, and will occasionally, when angered or pleased, raise or fall the feathers of its crest.

ORDER XV.—PALMIPEDES.

Birds of this order have the bill of various forms; legs short, placed more or less backwards; the anterior toes partially or wholly connected by webs, and in some families all the four toes united by one membrane; the hinder toe interiorly articulated to the tarsus, or, in some genera, wanting.

THE SKIMMER, OR CUTWATER,[1]

Is twenty inches in length, and in breadth three feet seven inches. The bill is of a very singular structure, the upper chap, or mandible, being above an inch shorter than the under, and the upper shuts into it, as a razor into its handle. The base of the bill is red, the rest black; and on the sides are several furrows. The forehead, chin, and all the under parts, are white; the upper parts of the plumage black, with a bar of white across each wing.

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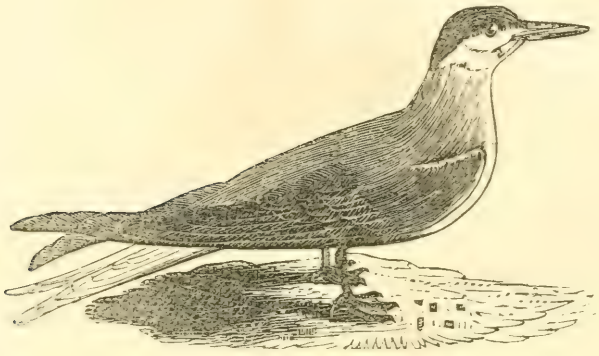
[1] *Rhynchops nigra*, Lin. The genus *Rhynchops* has the bill long, straight, flattened into a blade, truncated at the apex; upper mandible much shorter than the under; nostrils lateral, marginal, remote from the base; legs slender; tarsus larger than the middle toe; the fore toes united by a membrane; hind toe joined on the tarsus; tail forked, and shorter than the wings.

The tail is short and forked. It inhabits all America; is common y on the wing, and skims along the surface to catch the small fish on which it feeds. it is frequently known by the name of the razor-bill.

THE GREAT TERN[1]



Is about fourteen inches long, and weighs four ounces and a quarter. The bill and feet are a fine crimson; the former is tipped with black, and very slender. The back of the head is black; the upper part of the body a pale gray, and the under part white. These birds have been called sea swallows, as they appear to have all the same actions at sea that the swallow has at land, seizing every insect which appears on the surface, and darting down upon the smaller fishes, which they seize with incredible rapidity.

THE LESSER TERN[2]

Weighs only two ounces and five grains. The bill is yellow; and from the eyes to the bill is a black line. In other respects, it almost exactly resembles the preceding.

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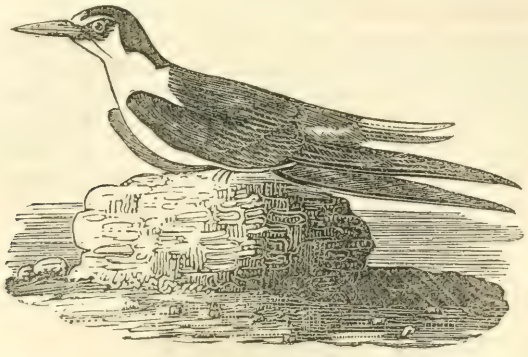
[1] *Sterna hirundo*, Lin. The genus *Sterna* has the bill as long as, or longer than the head, almost straight, compressed, slender, edged, and pointed; mandibles of equal length, the upper slightly sloping towards the tip; nostrils in the middle of the bill longitudinally cleft and pervious; legs small, naked above the knee; tarsus very short, the three anterior toes connected by a membrane, the hinder detached; tail more or less forked; wings very long, and pointed.

[2] *Sterna minuta*, Lin.

Among the foreign birds of the tern genus, there are some found of a snowy white; but the most singular bird of this kind is the striated tern,



which is found at New Zealand. It is thirteen inches in length. The bill is black, and the body in general mottled, or rather striped with black and white.

THE NODDY[1]

Is about fifteen inches long. The bill is black, and two inches long, and the whole plumage a sooty brown, except the top of the head, which is white. It is a very common bird in the tropical seas, where it is known frequently to fly on board ships, and is taken with the hand. But though it be thus stupid, it bites the fingers severely, so as to make it unsafe to hold it. It is said to breed in the Bahama Islands.

THE GULL,[2]

And all its varieties, is well known to most readers. It is seen with slow sailing flight hovering over rivers, to prey upon the smaller kinds of fish; it is seen following the ploughman in fallow fields to pick up insects; and

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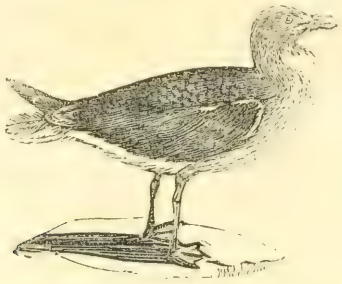
[1] *Sterna stolida*, Lath.

[2] The genus *Larus*, which comprises most of the gulls has the bill long, or middle sized, strong, hard, compressed, edged, bent toward the tip; lower mandible angulated near the point; nostrils lateral, in the middle of the bill, longitudinally cleft, straight, and pervious; legs slender, naked above the knee; tarsus long; three fore toes quite webbed, the hinder free, short, placed high on the tarsus; tail feathers of equal length; wings long.

when living animal food is not to be found, it has even been known to eat carrion, and whatever else offers of the kind.

Of the gull there are about nineteen species. The largest with which we are acquainted is, the black and white or black-backed gull.[1] It generally weighs upwards of four pounds, and is twenty-five or twenty-six inches from the point of the bill to the end of the tail; and from the tip of each wing, when extended, five feet and several inches. The bill appears compressed sideways, being more than three inches long, and hooked towards the end, like the rest of this kind, of a sort of orange color; the nostrils are of an oblong form; the mouth is wide, with a long tongue, and very open gullet.



The irides of the eyes are of a delightful red. The wings and the middle of the back are black; only the tips of the covert and quill feathers are white. The head, breast, tail, and other parts of the body, are likewise white. The tail is near six inches long, the legs and feet are flesh-colored, and the claws black. There are about twenty varieties of this tribe, which are all distinguished by an angular knob on the chap.

Gulls are found in great plenty in every place; but it is chiefly round the rockiest shores, that they are seen in the greatest abundance; it is there that the gull breeds and brings up its young; it is there that millions of them are heard screaming with discordant notes for months together.

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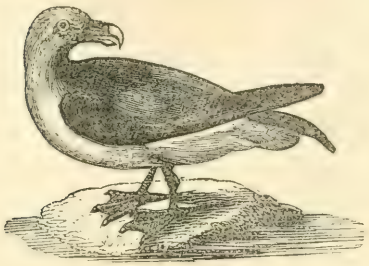
[1] *Larus marinus*, Lin.

THE PETREL

THE whole genus of petrels are known by having, instead of a back toe, only a sharp spur or nail; they have also a faculty of spouting from their bills, to a considerable distance, a large quantity of pure oil, which they do, by way of defence, into the face of any person who attempts to take them.

THE FULMAR PETREL[1]



Is the largest of the kind which is known in Europe. It is superior to the size of the common gull, being about fifteen inches in length, and in weight seventeen ounces. The bill is very strong, yellow, and hooked at the end. The head, neck, and all the under parts of the body, are white; the back and wings ash-colored, the quills dusky, and the tail white. It feeds on the blubber of whales, which supplies the reservoir, whence it spouts, with a constant stock of ammunition. This oil is esteemed by the inhabitants of the north, as a sovereign remedy in many complaints, both external and internal. The flesh is also considered by them as a delicacy, and the bird is therefore in great request at St Kilda. When a whale is taken, these birds will, in defiance of all endeavors, light upon it, and pick out large lumps of fat, even while it is alive.

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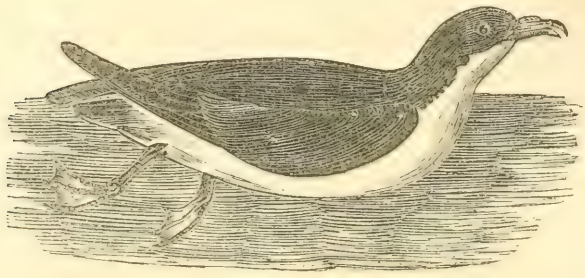
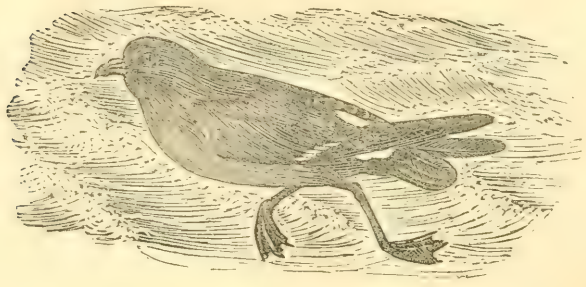
[1] *Procellaria glacialis*, LIN. The genus *Procellaria* has the bill as long as, or longer than the head, very hard, edged, depressed, and dilated at the base; the tip compressed, and arched, both mandibles channelled, and abruptly inflected towards the extremity; nostrils prominent at the surface of the bill, united, and concealed in a tube which either forms a single opening, or exhibits two distinct openings; legs middle sized, often long, slender; the tarsi compressed; the three front toes entirely webbed and long, and the hinder represented by a pointed claw; wings long.

THE SHEARWATER, OR MANKS PUFFIN,[1]



As it is called by Willoughby, is something smaller than the preceding The head and all the upper part of the body are of a sooty blackness; and the under part, and inner coverts of the wings, white. These birds are found in the Isle of Man, and the Scilly isles. In February, they take a short possession of the rabbit burrows, and then disappear till April; they lay one egg, and in a short time the young are fit to be taken. They are then salted and barrelled. During the day, they keep at sea, fishing, and towards evening return to their young, whom they feed, by discharging the contents of the stomach into their mouths.

THE STORMY PETREL[2]



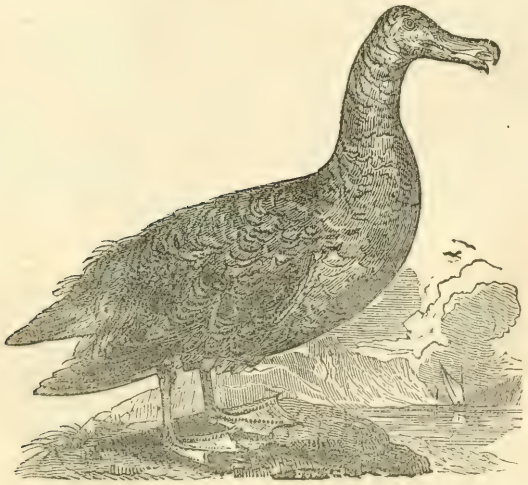
Is about the size of a house swallow. The general color of the plumage is black, except about the rump, which is white. They are always to be found on the shores of Britain, and seem to be diffused all over the world. They sometimes hover over the water like swallows, and sometimes appear to

[1] *Procellaria Anglorum*, TEM. [2] *Procellaria pelagica*, LIN.

run on the top of it, they are also excellent divers. It skims along the hollows of the waves, and through the spray upon their tops, at the astonishing rate of sixty miles in an hour. They are very clamorous, and are called by the sailors *Mother Cary's Chickens*, who observe they never settle or sit upon the water but when stormy weather is to be expected. They are found in most parts of the world; and in the Feroe islands, the inhabitants draw a wick through the body of the bird, from the mouth to the rump, which serves them as a candle, being fed by the vast proportion of oil which this little animal contains.

Wilson supposed the American stormy petrel to be the same as that of Europe; but Charles Bonaparte has shown that it is a distinct species. It breeds in great numbers on the shores of the Bahama and Bermuda isles, and on the coast of East Florida and Cuba. This author enumerates four species of the stormy petrel.

THE ALBATROSS



Is one of the largest and most formidable birds of Africa and South America. The largest, which is called the wandering albatross,[1] is rather larger than

[1] *Diomedea exulans*, Lin. The genus *Diomedea* has the bill very long, stout, edged, compressed, straight, suddenly curved; upper mandible channelled on the sides, and much hooked at the point, the under smooth, and truncated at the extremity; nostrils lateral, remote from the base, tubular, covered on the sides, and open in front; legs short, with only three very long toes entirely webbed; the lateral one margined; wings very long and narrow, with the primary quills short, and the secondaries long.

a swan, and its wings, when extended, ten feet from tip to tip. The bill, which is six inches long, is yellowish, and terminates in a crooked point. The top of the head is of a bright brown; the back is of a dirty, deep spotted brown; and the belly, and under the wings, is white. The toes, which are webbed, are of a flesh color.

This bird is an inhabitant of the tropical climates, and also beyond them, as far as the Straits of Magellan, in the South seas. It not only eats fish, but also such small water-fowl as it can take by surprise. It preys, as the gull kind do, upon the wing, and chiefly pursues the flying fish that are forced from the sea by the dolphins.

The albatross seems to have a peculiar affection for the penguin, and a pleasure in its society. They are always seen to choose the same places of breeding; some distant, uninhabited island, where the ground slants to the sea, as the penguin is not formed either for flying or climbing. In such places their nests are seen together, as if they stood in need of mutual assistance and protection. In the middle, on high, the albatross raises its nest on heath, sticks, and long grass, about two feet above the surface; and round this the penguins make their lower settlements, rather in holes in the ground; and most usually eight penguins to one albatross.

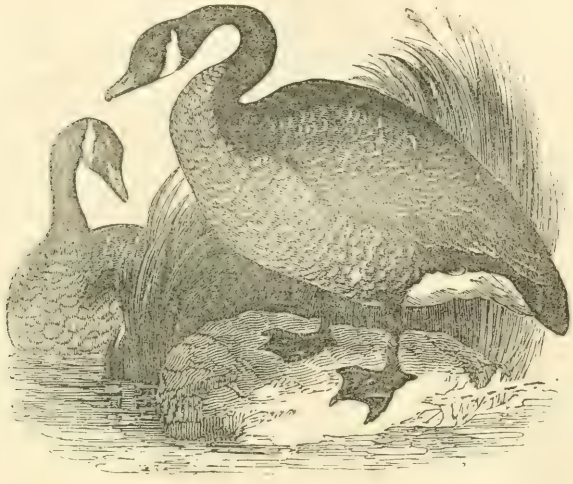
There are about three other species of albatross, all of them smaller than the preceding. The upper parts of the plumage are a dusky blue black, and the rump and under parts white; but what peculiarly distinguishes it is, that the bill, which is four inches long, is black, all but the upper ridge, which is yellow quite to the tip. It inhabits the South seas within the tropics.

THE AMERICAN WILD GOOSE.[1]

This is a bird universally known over the whole country, and whose regular periodical migrations are the sure signals of returning spring, or approaching winter. I have never yet visited, says Wilson, any quarter of the country, where the inhabitants are not familiarly acquainted with the passing and repassing of the wild geese. The general opinion here is, that they are on their way to the lakes to breed; but the inhabitants on the con-

[1] *Anas canadensis*, Lin. The genus *Anas* has the bill middle-sized, robust, straight, more or less depressed, covered by a thin skin, often deeper than broad at the base, which is furnished with a fleshy tubercle, or smooth; always depressed towards the tip, which is obtuse and furnished with a nail; edges of both mandibles divided into conical or flat lamellated teeth; nostrils almost at the surface of the bill, at some distance from the base, ovoid half closed by the flat membrane that covers the nasal furrow; legs short, feathered to the knee, and placed near the abdomen; the three fore toes webbed; the hinder detached, and either destitute of a web, or having only a rudimentary one.

fines of the great lakes are equally ignorant with ourselves of the particular breeding places of these birds. *There*, their journey north is but commencing, and how far it extends it is impossible for us at present to ascertain. They were seen by Hearne in large flocks within the arctic circle, and were then pursuing their way still farther north. They have been seen, also, on the dreary coast of Spitsbergen, feeding on the water's edge. It is highly probable that they extend their migrations under the very pole itself, amid the silent desolation of unknown countries, shut out from the eye of man by everlasting barriers of ice. That such places abound with suitable food, we cannot for a moment doubt.



The flight of the wild geese is heavy and laborious, generally in a straight line, or in two lines approximating to a point. In both cases, the van is led by an old gander, who every now and then pipes his well known *houk*, as if to ask how they come on; and the houk of "all's well," is generally returned by some of the party. When bewildered in foggy weather, they appear sometimes to be in great distress, flying about in an irregular manner, making a great clamor. On these occasions, should they alight on the earth, as they sometimes do, they meet with speedy death and destruction. The autumnal flight lasts from the middle of August to the middle of October; the vernal flight from the middle of April to the middle of May.

Wounded geese have frequently been domesticated, and readily pair with tame geese. On the approach of spring, however, they discover symptoms of great uneasiness, frequently looking up into the air, and attempting to go off. Some, whose wings have been closely cut, have travelled on foot in a northerly direction, and have been found at a distance of several miles from

nome. They hail every flock that passes overhead, and the sa ute is sure to be returned by the voyagers, who are only prevented from alighting among them, by the presence and habitations of man. The gunners sometimes take one or two of these domesticated geese with them to those places over which the wild ones are accustomed to fly; and concealing themselves, wait for a flight, which is no sooner perceived by the decoy geese, than they begin calling aloud, until the flock approaches so near, that the gunners are enabled to make great havoc among them with their musket shot.

The English at Hudson's Bay depend greatly on geese, and in favorable seasons kill three or four thousand, and barrel them up for use. They send out their servants, as well as Indians, to kill them on their passage. They mimic the cackle of geese so well, that many of them are allured to the spot where they are concealed, and are thus easily shot. When in good order, the wild goose weighs from ten to fourteen pounds, and is estimated to yield half a pound of feathers. It is domesticated in numerous quarters of the country, and is remarked for being extremely watchful, and more sensible of approaching changes in the atmosphere than the common gray goose. In England, France and Germany, they have been long ago domesticated.

Mr Platt, a respectable farmer on Long Island, being out shooting in one of the bays which in that part of the country abound in water-fowl, wounded a wild goose. Being unable to fly, he caught it and brought it home alive. It proved to be a female, and turning it into his yard with a flock of tame geese, it soon became quite familiar, and in a little time its wounded wing entirely healed. In the following spring, when the wild geese migrate to the northward, a flock passed over Mr Platt's barn-yard, and just at that moment, their leader happening to sound the bugle note, our goose, in whom its new habits and enjoyments had not quite extinguished the love of liberty, and remembering the well-known sound, spread its wings, mounted into the air, joined the travellers, and soon disappeared. In the succeeding autumn, the wild geese, as usual, returned from the northward in great numbers, to pass the winter in our bays and rivers. Mr Platt happened to be standing in his yard, when a flock passed directly over his barn. At that instant, he observed three geese detach themselves from the rest, and after wheeling round several times, alight in the middle of the yard. Imagine his surprise and pleasure, when, by certain well remembered signs, he recognised in one of the three his long-lost fugitive. It was she indeed! She had travelled many hundred miles to the lakes; had there hatched and reared her offspring; and had now returned with her little family, to share with them the sweets of civilized life.

THE EUROPEAN WILD GOOSE [1]

The wild goose, or gray lag, always retains the same marks: the whole upper part is ash colored; the breast and belly are of a dirty white; the bill is narrow at the base, and at the tip it is black; the legs are of a saffron color, and the claws black. It frequently weighs about ten pounds.

The wild goose is supposed to breed in the northern parts of Europe, and, in the beginning of winter, to descend into more temperate regions. If they come to the ground by day, they range themselves in a line, like cranes; and seem rather to have descended for rest, than for other refreshment. When they have sat in this manner for an hour or two, we have heard one of them, with a loud, long note, sound a kind of charge, to which the rest punctually attended, and they pursued their journey with renewed alacrity. Their flight is very regularly arranged; they either go in a line abreast, or in two lines, joining in an angle in the middle.

The common tame goose is nothing more than this goose in a state of domestication. The tame goose is sometimes white, and generally varies between white and gray.

There are also the barnacle goose,[2] the brant goose,[3] the bear goose,[4] and a variety of others.

THE SWAN.[5]

So much difference is there between this bird, when on land and in the water, that it is hardly to be supposed the same, for in the latter, no bird can possibly exceed it for beauty and majestic appearance. When it ascends from its favorite element, its motions are awkward, and its neck is stretched forward with an air of stupidity; it has, indeed, the air of being only a larger sort of goose; but when seen smoothly gliding along the water, displays a thousand graceful attitudes, and moving at pleasure without the smallest apparent effort, there is not a more beautiful figure in all nature. In its form, we find no broken or harsh lines; in its motions, nothing constrained or abrupt, but the roundest contours, and the easiest transitions; the eye wanders over the whole with unalloyed pleasure, and, with every change of position, every part assumes a new grace. It will swim faster than a man can walk.

This bird has long been rendered domestic; and it is now doubtful whether there be any of the tame kind in a state of nature. The color of the tame swan is entirely white, and it generally weighs full twenty pounds. Under

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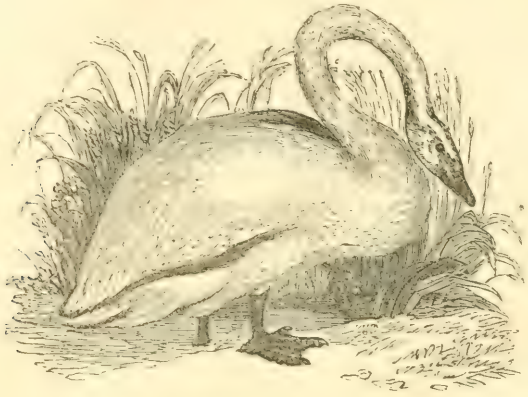
[1] *Anas anser*, Lin. [2] *Anas leucopsis*, Temm. [3] *Anas bernicla*, Lin.
[4] *Anas segetum*, Gmel. [5] *Anas olor*, Lin.

the feathers is a very thick, soft down, which is made an article of commerce, for purposes of both use and ornament. The windpipe sinks down into the lungs in the ordinary manner; and it is the most silent of all the feathered tribe; it can do nothing more than hiss, which it does on receiving any provocation. In these respects, it is very different from the wild or whistling swan.



This beautiful bird is as delicate in its appetites as it is elegant in its form. Its chief food is corn, bread, herbs growing in the water, and roots and seeds, which are found near the margin. At the time of incubation, it prepares a nest in some retired part of the bank, and chiefly where there is an islet in the stream. This is composed of water plants, long grass, and sticks; and the male and female assist in forming it with great assiduity. The swan lays seven or eight white eggs, one every other day, much larger than those of a goose, with a hard, and sometimes a tuberous shell. It sits six weeks before its young are excluded; which are ash colored when they first leave the shell, and for some months after. It is not a little dangerous to approach the old ones, when their little family are feeding around them. Their fears as well as their pride, seem to take the alarm, and, when in danger, the old birds carry off the young ones on their back. A female has been known to attack and drown a fox, which was swimming towards her nest; they are able to throw down and trample on youths of fifteen or sixteen; and an old swan can break the leg of a man with a single stroke of its wing.

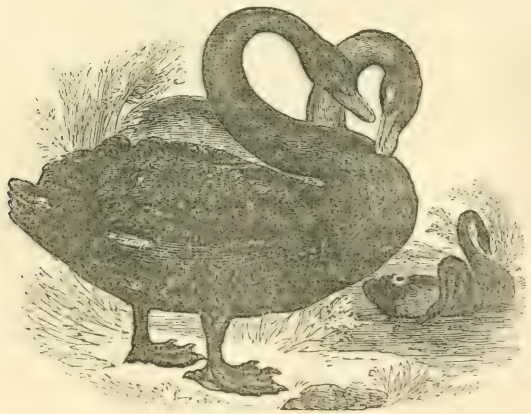
Swans were formerly held in such great esteem in England, that, by an act of Edward the Fourth, none, except the son of the king, was permitted to keep a swan, unless possessed of a freehold to the value of five marks a year. By a subsequent act, the punishment for taking their eggs was imprisonment for a year and a day, and a fine at the king's will. At present, they are not valued for the delicacy of their flesh; but numbers are still pre-

served for their beauty. Many may be seen on the Thames, where they are esteemed royal property, and it is accounted felony to steal their eggs. On this river, as far as the conservancy of it belongs to the city of London, they are under the care of the corporation; and at certain times the lord mayor, aldermen, &c. proceed up the Thames, to what is commonly called the swan hopping, to mark the young birds. The swan is a long-lived bird, and sometimes attains the age of more than a hundred years.

THE WILD OR WHISTLING SWAN,[1]

Though so strongly resembling the tame swan in color and form, is yet a different bird; for it is very differently formed within. The wild swan is less than the tame, almost a fourth; for as the one weighs twenty pounds, the other only weighs sixteen pounds and three quarters. The color of the tame swan is all over white; that of the wild bird is along the back and the tips of the wings of an ash color; the tame swan is mute, the wild one has a sharp loud cry, particularly while flying. But these are slight differences, compared to what are found upon dissection. The wild species is found in most of the northern regions, in America, and probably in the East Indies.

THE BLACK SWAN.

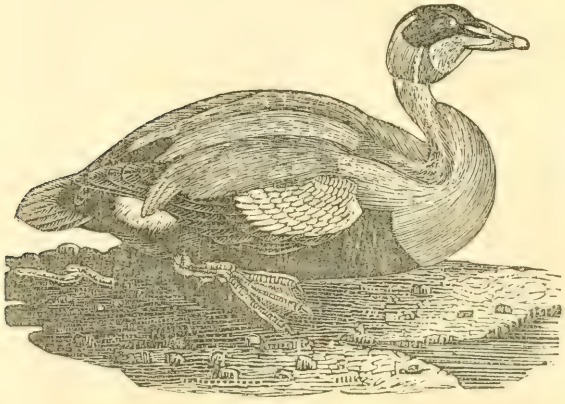


New Holland, that country of animal wonders, presents us with a bird which the ancients imagined could not possibly have existence. The black

[1] *Anas cygnus*, Lin.

swan is exactly similar in its form to the swan of the old world, but is somewhat smaller in size. Every part of its plumage is perfectly black, with the exception of the primary and a few of the secondary quill feathers, which are white. The bill is of a bright red above, is crossed at the anterior part by a whitish band; is of a grayish white on the under part; and, in the male, is surmounted at the base by a slight protuberance. The legs and feet are of a dull ash color. Black swans, in their wild state, are extremely shy. They are found in Van Dieman's Land, New South Wales, and on the western coast of New Holland; and are generally seen swimming on a lake, in flocks consisting of eight or nine individuals. On being disturbed, they fly off in a direct line one after the other, like wild geese.

THE EIDER DUCK[1]



Has a black, cylindrical bill, and the feathers of the forehead and cheeks advance far into the base. In the male, the feathers of part of the head, the lower part of the breast, the belly and the tail, are black, as are also the quill feathers of the wings; and nearly all the rest of the body is white. The legs are green. The female is of a reddish brown, variously marked with black and dusky streaks. It is principally found in the western isles of Scotland, on the coasts of Norway, Iceland and Greenland, and in many parts of North America.

The female lays from three to five eggs, (sometimes as many as eight,) which are large, smooth, glossy, and of a pale olive color. She generally

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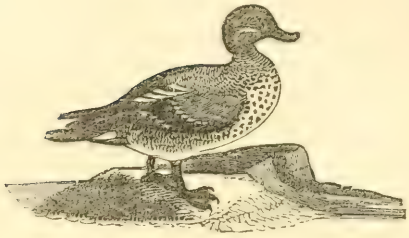
[1] *Anas mollisima*, Lin

lays among stones, or plants, near the sea, but in a soft bed of down, which she plucks from her own breast. Sometimes two females will lay their eggs in the same nest, in which case they always agree remarkably well. As long as the female is sitting, the male continues on watch near the shore; but as soon as the young are hatched, he leaves them. The mother, however, remains with them a considerable time afterwards. It is curious to observe her manner of leading them out of the nest, almost as soon as they creep from the eggs. Going before them to the shore, they trip after her; and, when she comes to the water-side, she takes them on her back, and swims a few yards with them, when she dives; and the young ones are left floating on the surface, obliged to take care of themselves. They are seldom seen afterwards on land.

In Iceland, the eider ducks generally build their nests on small islands, not far from the shore; and sometimes even near the dwellings of the natives, who treat them with so much attention and kindness as to render them nearly tame. From these birds is produced the soft down, so well known by the name of the eider, or edder down, which is so light and expansive that a couple of handfuls will fill a down quilt, which, in cold countries, is used instead of a quilt or blanket. In the breeding season, the birds pluck it from their breasts to line their nests, and make a soft bed for the young ones. When the natives come to the nests, they carefully remove the female and take away the superfluous down and eggs; after this, they replace the female; she then begins to lay afresh, and covers her eggs with new down, which she also plucks from her body; when this is scarce, or she has no more left, the male comes to her assistance, and covers the eggs with his down, which is white, and easily distinguished from that of the female. When the young ones leave the nest, which is about an hour after they are hatched, it is once more plundered. The most eggs and best down are got during the first three weeks of their laying; and it has generally been observed, that they lay the greatest number of eggs in rainy weather. One female, during the time of laying, generally gives half a pound of down; which, however, is reduced one half after it is cleaned. The Iceland company at Copenhagen generally export from Iceland about one thousand five hundred or two thousand pounds weight of this down, besides what is privately purchased by foreigners.

The Greenlanders kill these birds with darts; pursuing them in their little boats, watching their course by the air bubbles when they dive, and always striking them when they rise to the surface wearied. The flesh is valued as food, and their skins are made into warm and comfortable under garments.

THE TEAL.[1]



This is the smallest bird of the duck kind; it is common in England in the winter months; and some imagine that it breeds there as well as it does in France. It does not usually weigh more than twelve ounces; and it measures about sixteen inches from the point of the bill to the tip of the tail, and from the extremity of each wing, when extended, nearly two feet. The bill is of a dark brown color, the head is considerably lighter, inclining to a bay, with a large white stripe over each eye, bending downwards, towards the back part of the head; the back and sides under the wings are curiously varied with lines of white and black. The breast is of a dirty colored yellow, interspersed with dusky transverse lines; the belly more bright, with yellowish brown spots; the quill feathers of the wings are of a dusky brown, with white edges; the covert feathers appear of a fine shining green, with their tips white; the scapular feathers are more inclining to an ash color; the legs and feet are brown, the claws black. These birds feed on cresses, chervil, and other weeds, and also on seeds and some kinds of water insects. The flesh is a great delicacy, and has a less fishy taste than any other of the wild duck tribe.

The female constructs her nests of reeds interwoven with grass, and is said to make it among rushes, that it may rise or fall with the varying height of the water.

THE WIDGEON.[2]

This bird weighs about twenty-two ounces; it has a black nail at the end of the upper mandible of the bill, the other part of which is of a lead color; the structure of the head and mouth very much resembles the common wild duck, only the head does not seem to be quite so large, in propor-

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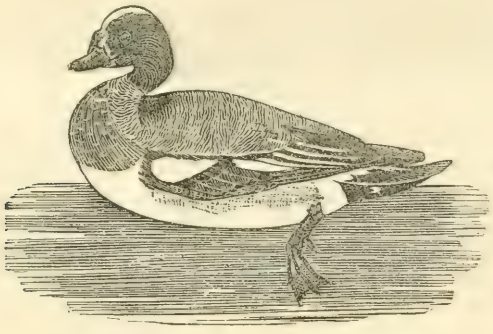
[1] *Anas crecca*, Lin. [2] *Anas Penelope*, Lin.

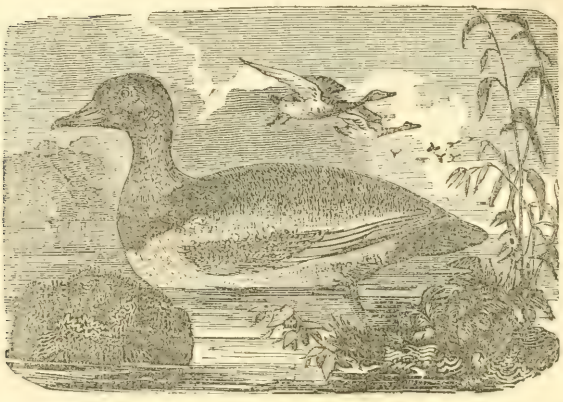
tion to the body, which also appears of a finer shape, and the wings longer. The crown of the head towards the base of the bill is of a pale pink color, inclining to a reddish white; the other parts of the head and neck are red; the sides of the body and the upper part of the breast are tinctured with a very fair, glossy, and beautiful claret color, with a few small transverse lines of black. The feathers on the back are brown, the edges more pale or ash colored; the scapular feathers, and those under the fore part of the wings, are finely variegated with small transverse black and white lines, beautifully dispersed like waves; the quill feathers are some of them brown, with white tips, others have their outward webs of a blackish purple; other parts, especially those beyond the covert feathers, of a lovely fine blue; some of the exterior feathers have their outward webs inclining to black, with a fine purple gloss upon the borders, on which there are a number of



small light colored spots; the rest of the wing feathers are of a beautiful party-colored brown and white. The upper part of the tail is ash colored; the under part, behind the vent, black. The legs and feet are of a dark lead color, and the claws black. The young of both sexes are gray, and this hue they retain till February, when the plumage of the male begins to assume its variegated tints. He is said to retain his bright colors till the end of July, and then to become dark and gray, so as scarcely to be distinguished from the female.

Widgeons are common in Cambridgeshire, England, the Isle of Ely, &c., where the male is called the Widgeon, and the female the Whewer. They feed upon wild periwinkles, grass, weeds, &c., which grow at the bottom of rivers and lakes. Their flesh has a fine taste.

THE CANVASS-BACK DUCK[1]



Is a very celebrated species, unknown in Europe. They appear in the United States about the middle of October, and great numbers of them are found on the rivers near Chesapeake Bay. The canvass-back, in the rich juicy tenderness of its flesh, and its delicacy and flavor, stands unrivalled by the whole of its tribe in, perhaps, any other part of the world. They sometimes sell from one to three dollars a pair. Its length is about two feet, and its weight two pounds.

The most obvious distinction between wild and tame ducks is in the color of their feet; those of the tame duck being black; those of the wild duck yellow. The difference between wild ducks among each other, arises as well from their size, as the nature of the place they feed in. Sea ducks, which feed in the salt water, and dive much, have a broad bill, bending upwards, a large hind toe, and a long blunt tail. Pond ducks, which feed in plashes, have a straight and narrow bill, a small hind toe, and a sharp pointed train. The former are called in England, by the decoy-men, foreign ducks; the latter are supposed to be natives of England. In this tribe, we may rank, as natives of America, the velvet duck,[2] not so large, and with a yellow bill; the scoter duck, or black diver,[3] with a knob at the base of a yellow bill; the tufted duck,[4] adorned with a thick crest; the scaup duck,[5] less than the common duck, with the bill of a grayish blue color; the golden eye,[6] with a large white spot at the corners of the mouth, resembling an eye; the sheldrake,[7] with the bill of a bright red, and swelling into a knob; the mallard,[8] which is the stock whence the tame breed has probably

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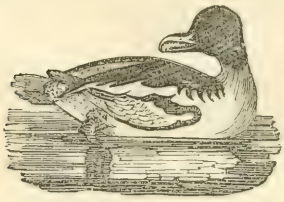
[1] *Anas valisneria*, WILSON. [2] *Anas fusca*, LIN. [3] *Anas nigra*, LIN.
[4] *Anas fuligula*, WILSON. [5] *Anas marila*, LIN. [6] *Anas clangula*, LIN.
[7] *Anas tadorna*, LIN. [8] *Anas boschas*, LIN.

been produced; the shoveller,[1] which has a bill three inches long, and remarkably broad at the end; the pintail,[2] with the two middle feathers of the tail three inches longer than the rest; the long-tailed[3] duck, the general color of whose plumage is deep chocolate, and the outer feathers of the tail, which are white, four inches longer than the rest.

THE GOOSANDER[4]



Weighs about four pounds. The bill is red; the head very full of feathers on the top and back part. The plumage is various and beautiful. The head and upper parts are fine glossy black, the rump and tail ash color, and the under parts of the neck and body a fine pale yellow. Its manners and appetites entirely resemble those of the diver. It feeds upon fish, for which it dives; it is said to build its nest upon trees, like the heron and the corvorant.

THE RED-BREASTED MERGANSER[5]

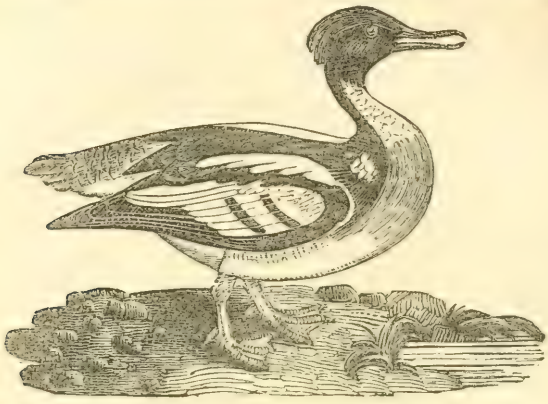
Is smaller, weighing only two pounds. The head and neck are black, glossed with green; the rest of the neck and the belly white; the upper part of the back is glossy black: the lower parts and the rump are striated with brown and pale gray; on the wings there are white bars tipped with black, and

[1] *Anas clypeata*, Lin. [2] *Anas Labradora*, Gmel. [3] *Anas glacialis.*

[4] *Mergus merganser*, Lin. The genus *Mergus* has the bill middle-sized or long, slender, in the form of an elongated cone, and almost cylindrical; base broad; tip of the upper mandible much hooked, and furnished with a nail; edges of both mandibles serrated in a backward direction; nostrils lateral towards the middle of the bill; legs short, placed backwards on the abdomen, the three fore toes completely webbed, the hind toe articulated on the tarsus.

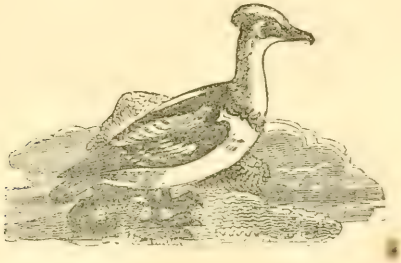
[5] *Mergus serrator*, Lin.

the breast is reddish, mixed with black and white. The plumage of the female is less splendid; and they differ in another respect, viz. that the male



has a very full and large crest, the female only the rudiment of one It is common on the shores of the United States as well as in Europe.

THE SMEW, OR WHITE-HEADED GOOSANDER,[1]



Measures eighteen inches from the point of the bill to the extremity. It has a fine crest upon the head, which falls down towards the back part of it, under which, on each side of the head, is a black spot; the rest of the head and neck, and the under parts of the body, are white; the back and the wings are a pleasing mixture of black and white. The tail is about three

[1] *Mergus albellus*, Lin.

inches long, of a kind of dusky ash color, the feathers on each side shortening gradually. The female has no crest; the sides of the head red; the wings of a dusky ash color; the throat is white. In other respects it agrees with the male.

THE HOODED MERGANSER[1]

Is a native of North America, and peculiar to that country. It is common on the coasts of New England, and breeds in the arctic regions. It is about the size of a widgeon. The head and neck are dark brown; the former surrounded with a large round crest, the middle of which is white. The back and quills are black, the tail dusky; and the breast and belly white, undulated with black. The female is fainter in the color of her plumage, and has a smaller crest.

THE PELICAN.[2]

The great white pelican of Africa[3] is much larger than a swan. Its four toes are all webbed together; and its neck, in some measure, resembles that of a swan; but that singularity in which it differs from all other birds, is in the bill, and the great pouch underneath, which are wonderful, and demand a distinct description. This enormous bill is fifteen inches from the point to the opening of the mouth, which is a good way back behind the eyes. The base of the bill is somewhat greenish; but it varies towards the end, being of a reddish blue. To the lower edges of the under chap hangs a bag, reaching the whole length of the bill to the neck, which is said to be capable of containing fifteen quarts of water. This bag the bird has a power of wrinkling up into the hollow of the under chap; but, by opening the bill, and putting one's hand down into the bag, it may be distended at pleasure. It is no. covered with feathers, but a short downy substance, as smooth and soft as satin. Tertre affirms, that this pouch will hold as many fish as will serve sixty hungry men for a meal. Such is the formation of this extraordinary bird, which is a native of Africa and America. It was once also known

[1] *Mergus cucullatus*, Lin.

[2] The genus *Pelicanus* has the bill long, straight, broad, much depressed; upper mandible flattened, terminated by a nail, or very strong hook; the lower formed by two long branches, which are depressed, flexible, and united at the tip; from these branches is suspended a naked skin, in form of a pouch; face and throat naked; nostrils basal, in the form of a narrow longitudinal slit; legs short and stout; all the four toes connected by a web.

[3] *Pelicanus onocrotalus*, Lin.

in Europe, particularly in Russia; but it seems to have deserted those coasts.

In the island of Manilla, the pelicans are of a rose color, and in America they are brown. They are all torpid and inactive to the last degree, so that nothing can exceed their indolence but their gluttony. It is only from the stimulations of hunger that they are excited to labor; for otherwise they would continue always in fixed repose. When they have raised themselves about thirty or forty feet above the surface of the sea, they turn their head, with one eye downwards, and continue to fly in that posture. As soon as

they perceive a fish sufficiently near the surface, they dart down upon it with the swiftness of an arrow, seize it with unerring certainty, and store it up in their pouch. They then rise again, though not without great labor, and continue hovering and fishing, with their head on one side, as before.

This work they continue, with great effort and industry, till their bag is full; and then they fly to land, to devour and digest, at leisure, the fruits of their industry. This, however, it would appear, they are not long performing; for, towards night, they have another hungry call; and they again, reluctantly, go to labor.

Sometimes, they are said to assemble in large numbers, to act in concert, and to manœuvre with great skill, for the purpose of securing an abundant prey. This they accomplish by forming a circular line, and gradually nar-

rowing the included space, till the fishes are driven within a narrow compass. They then all plunge into the water at once, on a given signal, fill their pouches with the spoil, and then return to the land, to enjoy themselves at leisure.

Their life is spent between sleeping and eating. The female makes no preparation for her nest, nor seems to choose any place in preference to lay in, but drops her eggs on the bare ground, to the number of five or six, and there continues to hatch them. Her little progeny, however, seem to call forth some maternal affections; for its young have been taken and tied by the leg to a post, and the parent bird has been observed for several days to come and feed them; remaining with them the greater part of the day, and spending the night on a branch of a tree that hung over them. By these means they become so familiar that they suffered themselves to be handled; and they very readily accepted whatever fish was given to them. These they always put first into their pouch, and then swallowed them at leisure.

THE CORMORANT, OR CORVORANT,[1]

Is about the size of a large Muscovy duck. The head and neck of this bird are of a sooty blackness, and the body thick and heavy, more inclining in figure to that of the goose, than the gull. As soon as the winter approaches, they are seen dispersed along the seashore, and ascending up the mouths of fresh water rivers, carrying destruction to all the finny tribe. They are most remarkably voracious, and have a most sudden digestion. Their appetite is forever craving, and never satisfied. This gnawing sensation may probably be increased by the great quantity of small worms that fill their intestines, and which their increasing gluttony contributes to engender.

This bird has the most rank and disagreeable smell, and is more fœtid than even carrion, when in its most healthful state. It is seen as well by land as sea; it fishes in fresh water lakes as well as in the depths of the ocean; it builds in the cliffs of rocks, as well as on trees; and preys not only in the daytime, but by night.

Its indefatigable nature, and its great power in catching fish, were, probably, the motives that induced some nations to breed this bird up tame, for the purpose of fishing. The description of their manner of fishing is thus enlivened by Faber:

"When they carry them out of the rooms where they are kept, to the fish

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[1] *Carbo cormoranus*, Meyer. The genus *Carbo* has the bill middle-sized, or long, straight, compressed; upper mandible much bent at the tip, the lower compressed; base of the bill involved in a membrane which extends to the throat; face and throat naked nostrils basal, linear and concealed; legs strong, short, situated far behind; all the toes included in a web, and the middle claw serrated.

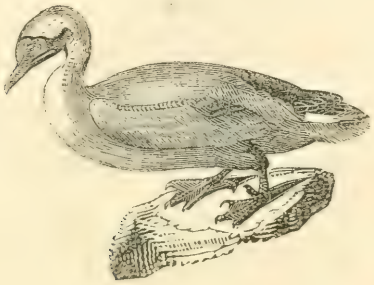
pools, they hoodwink them, that they may not be frightened by the way When they are come to the rivers, they take off their hoods; and having tied a leather thong round the lower part of their necks, that they may not swallow down the fish they catch, they throw them into the river. They presently dive under water; and there, for a long time, with wonderful swiftness, pursue the fish; and, when they have caught them, rise to the top of the water, and, pressing the fish lightly with their bills, swallow them; till each bird has, after this manner, devoured five or six fishes. Then their

keepers call them to the fist, to which they readily fly; and, one after another, vomit up all their fish, a little bruised with the first nip given in catching them. When they have done fishing, setting the birds on some high place, they loose the string from their necks, leaving the passage to the stomach free and open; and, for their reward, they throw them part of their prey; to each one or two fishes, which they will catch most dexterously, as they are falling in the air."

At present, the cormorant is trained up in every part of China for the same purpose. "It is very pleasant to behold with what sagacity they pursue out the lake or the canal where they are upon duty. When they have

found their prey, they seize it with their beak by the middle, and carry it without fail to their master. When the fish is too large, they then give each other mutual assistance; one seizes it by the head, the other by the tail, and in this manner carry it to the boat together. They have always while they fish, a string fastened round their throats, to prevent them from devouring their prey." Such was formerly the practice in England; and as late as the reign of Charles I., there was an officer of the household who bore the title of Master of the Cormorants.

THE GANNET, OR SOLAN GOOSE,[1]



Is of the size of a tame goose, but its wings much longer, being six feet over. The bill is six inches long, straight almost to the point. It differs from the corvorant in size, being larger; in its color, which is chiefly dirty white, with a cinereous tinge; and by its having no nostrils, but in their place a long furrow that reaches almost to the end of the bill. From the corner of the mouth is a narrow slip of black bare skin, that extends to the hind part of the head; beneath the skin is another that, like the pouch of the pelican, is dilatable, and of size sufficient to contain five or six entire herrings, which in the breeding season it carries at once to its mate or its young.

These birds, which subsist entirely upon fish, chiefly resort to those uninhabited islands where their food is found in plenty, and men seldom come to disturb them. The islands to the north of Scotland, the Skelig islands off the coasts of Kerry, in Ireland, and those that lie in the North sea off Norway, abound with them. But it is on the Bass island, in the firth of

[1] *Sula alba*, MEYER. The genus *Sula* has the bill long, stout, in the form of an elongated cone, very thick at the base, compressed towards the tip, which is obliquely curved; cleft beyond the eyes; edges of both mandibles serrated; face and throat naked; nostrils basal, linear, and concealed; legs short, stout, placed far behind; all the toes connected by a web; claw of the middle toe serrated; wings long; tail conical, and composed of twelve feathers

Edinburgh, where they are seen in the greatest abundance. "It is scarcely possible to walk there without treading on them; the flocks of birds upon the wing are so numerous as to darken the air like a cloud; and their noise is such, that one cannot, without difficulty, be heard by the person next to him."

THE TROPIC BIRD[1]

Includes only three known species, which are all distinguished by a wedge-like tail, the two middle feathers extending a vast length beyond the others

THE COMMON TROPIC BIRD[2]

Is about the size of a widgeon. The length to the tip of the two long feathers is nearly three feet. The bill is three inches long, and red; the head, neck, and under parts of the body, are quite white; the upper parts of the plumage white also, but marked with black lines. The two middle feathers of the tail measure twenty inches, and project fifteen inches beyond the rest. It takes its name from being chiefly found within the tropics. It frequently flies very high, but generally attends upon the flying-fishes in their escape from their watery enemies; and they have now and then been found in calm weather, supinely floating on the backs of the drowsy tortoises. Their flesh is not good, but is sometimes eaten by the hungry sailors.

THE GREAT NORTHERN DIVER[3]

Is a very large bird, weighing sixteen pounds, and measuring three feet six inches in length. The bill is strong, black, and above four inches in length.

[1] The genus *Phaëton* has the bill as long as the head, thick, stout, hard, sharp-edged much compressed, pointed, slightly sloped from the base; edges of the mandibles widened at the base, compressed and serrated in the rest of their length; nostrils basal, lateral, covered above and near the base, by a naked membrane, and pervious; legs very short, placed far back, all the toes connected by a web; wings long; tail short, but the two filamentous middle feathers very long.

[2] *Phaëton phœnicurus*, Lin.

[3] *Colymbus glacialis*, Lin. The genus *Colymbus* has the bill of medium size, straight, very pointed, compressed; nostrils basal, lateral concave, oblong, half closed by a membrane; legs placed far behind; tarsi compressed; the three fore toes very long and webbed; the hinder short, with a loose rudimentary web; wings short; tail very short and rounded.

The head and neck are velvet black, with a white crescent immediately under the throat, and another behind. The upper parts of the plumage are also black, spotted with white, and the breast and belly perfectly white. This bird is found in all the northern parts of Europe, and feeds on fish. It breeds on the inaccessible rocks and steep cliffs in the Isle of Man, and likewise in Cornwall, and several other places in England. The northern diver lays exceedingly large eggs; being full three inches long, blunt at one end, and sharp at the other, of a sort of bluish color, generally spotted with some black spots or strokes. It flies high and well. It is found on the coast of the United States, where it is known by the name of the *loon*.

THE PUFFIN[1]

Is the size of the teal, weighs about twelve ounces, and is twelve inches in length. The bill is much compressed; the half next the point is red, that next the base is blue gray. It has three furrows or grooves impressed in it; one in the livid part, two in the red. The eyes are fenced with a protuberant skin, of a livid color; and they are gray or ash colored.

The puffin, like all the rest of this kind, has its legs thrown so far back, that it can hardly move without tumbling. This makes it rise with difficulty, and subject to many falls before it gets upon the wing; but as it is a small bird, when it once rises, it can continue its flight with great celerity.

All the winter these birds are absent, visiting regions too remote for discovery. At the latter end of March, or the beginning of April, a troop of their spies, or harbingers, come and stay two or three days, as it were, to

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[1] *Mormon fratercula*, Temm. The genus *Mormon* has the bill shorter than the head, deeper than long, and much compressed; both mandibles arched transversely, furrowed, and notched towards the tip; ridge of the upper mandible elevated above the level of the skull; nostrils lateral, marginal, linear, naked, almost wholly concealed by a large naked membrane; legs short, placed far behind, furnished with only three toes all directed forwards, and webbed; claws much hooked; wings short.

view and search out their former situations, and see whether all be well This done, they once more depart; and, about the beginning of May, return again with the whole army of their companions. But if the season happens to be stormy and tempestuous, and the sea troubled, the unfortunate voyagers undergo incredible hardships; and they are found, by hundreds, cast away upon the shores, lean, and perished with famine.

The puffin, when it prepares for breeding, which always happens a few days after its arrival, begins to scrape out a hole in the ground, not far from the shore; and when it has penetrated some way into the earth, it then throws itself upon its back, and with its bill and claws thus burrows inward, till it has dug a hole with several windings and turnings, from eight to ten feet deep. It particularly seeks to dig under a stone, where it expects the greatest security. In this fortified retreat it lays one egg, which, though the bird be not much bigger than a pigeon, is the size of a hen's.

Few birds or beasts will venture to attack them in their retreats. When the great sea raven comes to take away their young, the puffin boldly opposes him. Their meetings afford a most singular combat. As soon as the raven approacees, the puffin catches him under the throat with its beak, and sticks its claws into its breast, which makes the raven, with a loud screaming, attempt to get away; but the little bird still holds fast to the invader, nor lets him go till they both come to the sea, when they drop down together, and the raven is drowned; yet the raven is but too often successful, and, nvading the puffin at the bottom of its hole, devours both the parent and its family.

THE GREAT AUK[1]

Is distinguished peculiarly by the form of the bill, which is strong, convex, compressed at the sides, in general crossed with several furrows, and in some degree resembling the coulter of a plough.

It is the size of a goose; its bill is black, about four inches and a quarter in length, and covered at the base with short, velvet-like feathers. The upper parts of the plumage are black, and the lower parts white, with a spot of white between the bill and the eyes, and an oblong stripe of the same on the wings, which are too short for flight. The bird is also a very bad walker, but swims and dives well. It is, however, observed by seamen,

[1] *Alca impenuis*, Lin. The genus *Alca* has the bill straight, broad, compressed, much bent towards the tip, both mandibles half covered with feathers, and grooved near the point, the upper hooked, the lower forming a salient angle; nostrils lateral, marginal, linear, situated near the middle of the bill, almost entirely closed by a membrane, and covered with feathers; legs short, placed far behind, with three toes directed forwards, and palmated; wings short.

that it is never seen out of soundings, so that its appearance serves as an infallible direction to land. It feeds on the lump fish, and others of the same

size, and is frequent on the coasts of Norway, Greenland, Newfoundland, &c. It lays its eggs close to the sea-mark.

THE RAZORBILL[1]

Is not above half the size of the preceding, which it resembles both in form and plumage, except that it has the use of its wings, and lays its egg (for each of these species lays but one) on the bare top of a precipice, and fastens it by a cement, so as to prevent its rolling off. It is pretty common on the coasts of England during the summer season.

THE PENGUIN.

The penguins seem to hold the same place in the southern parts of the world, as the auks do in the north, neither of them having ever been observed within the tropics. The wings of the larger species do not enable them to rise out of the water, but serve them rather as paddles, to help them forward when they attempt to move swiftly, and in a manner walk along the surface of the water. Even the smaller kinds seldom fly by choice; they flutter their wings with the swiftest efforts, without making way; and though they have but a small weight of body to sustain, yet they seldom venture to quit the water, where they are provided with food and protection.

[1] *Alca torda*, Lin.

As the wings of the penguin tribe are unfitted for flight, the legs are still more awkwardly adapted for walking. This whole tribe have all above the knee hid within the belly; and nothing appears but two short legs, or feet, as some would call them, that seem stuck under the rump, and upon which the animal is very awkwardly supported. They seem, when sitting, or attempting to walk, like a dog that has been taught to sit up, or to move a minuet. Their short legs drive the body in progression from side to side; and were they not assisted by their wings, they could scarcely move faster than a tortoise.

This awkward position of the legs, which so disqualifies them for living upon land, adapts them admirably for a residence in water; in that, the legs, placed behind the moving body, push it forward with greater velocity; and these birds, like Indian canoes, are the swiftest in the water, by having their paddles in the rear.

They are also covered more warmly all over the body with feathers, than any other birds whatever; so that the sea seems entirely their element.

THE PATAGONIAN PENGUIN[1]

Weighs about forty pounds, and is four feet three inches in length. The bill measures four inches and a half, but is slender. The head, throat, and hind part of the neck, are brown; the back of a deep ash color; and all the under parts white. The Magellanic penguin is about the size of a goose; the upper parts of the plumage are black, and the under white. These birds walk erect, with their heads on high, their fin-like wings hanging down like arms; so that to see them at a distance, they look like so many children with white aprons. Hence they are said to unite in themselves the qualities of men, fowls, and fishes. Like men, they are upright; like fowls, they are feathered; and, like fishes, they have fin-like instruments, that beat the water before, and serve for all the purposes of swimming rather than flying.

ORDER XVI.—INERTES.

Birds of this order have the bill of different forms; body probably thick, covered with down, and feathers with distant webs; legs placed much behind; tarsus short; three toes before, divided to the base; hind toe short

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[1] *Aptenodytes Patachonica*, Lath. The genus *Aptenodytes* has the bill longer than the head, slender, straight, inflected at the tip; upper mandible furrowed throughout its whole length, the under wider at the base, and covered with a naked and smooth skin; nostrils in the upper part of the bill concealed by the feathers of the forehead, legs very short, thick, placed far behind; four toes directed forward, three of which are webbed, and the fourth very short; wings incapable of flight.

articulated exteriorly, claws thick and sharp; wings improper for flight. There are only two birds known of this order; the apteryx, a bird inhabiting New Zealand, and the dodo

THE DODO.[1]

Swiftness is generally considered as the peculiar attribute of birds; but the dodo, instead of exciting that idea by its appearance, seems to strike the imagination as a thing the most unwieldy and inactive of all nature. Its body is massive, almost cubical, and covered with gray feathers; it is just barely supported upon two short thick legs like pillars. The neck, thick and pursy, is joined to the head, which consists of two great chaps, that open far behind the eyes, which are large, black, and prominent; so that the animal, when it gapes, seems to be all mouth. The bill, therefore, is of an extraordinary length, not flat and broad, but thick, and of a bluish white, sharp at the end, and each chap crooked in opposite directions. From all this, results a stupid and voracious physiognomy; which is still more increased by a bordering of feathers round the root of the beak, and which give the appearance of a hood or cowl. The dodo is furnished with wings, covered with soft ash-colored feathers; but they are too short to assist it in flying. It is furnished with a tail, and with a few small curled feathers;

[1] *Didus ineptus*, Lin. The characteristics of the genus *Didus* are a bill long, stout, broad, compressed; upper mandible bent at the point, transversely furrowed; lower mandible straight, gibbous, bent upwards at the point; nostrils in the middle of the bill, placed obliquely in a furrow; tarsus short; three toes before, divided, the hind toe short, claws short, bent; wings incapable of flight.

but this tail is disproportioned and displaced. Its legs are too short for running, and its body too fat to be strong.

This bird was a native of the Isle of France; and the Dutch, who first discovered it there, called it in their language the *nauseous bird*, as well from its disgusting figure, as from the bad taste of its flesh. However, succeeding observers contradict this last report, and assert that its flesh is good and wholesome eating. It is a simple bird, and is very easily taken. Three or four dodos are enough to dine a hundred men.

This bird, says Loudon's Magazine of Natural History, was originally found on the uninhabited islands in the Indian ocean, and in great numbers; but from various accounts it is supposed now to have entirely disappeared. The dodo, or as it is sometimes called, the solitaire, was seen in numbers; by Vasco de Gama, a Portuguese navigator, in 1497, and in 1614, on the islands of Bourbon and Mauritius. He speaks of them as being very tame, and not at all afraid of man.

Leguat, who visited the island of Rodriguez, in 1691, gives a long account of the solitaire. Though generally represented as a clumsy and ill-formed bird, he speaks of it as graceful and dignified in its movements, and as possessing great beauty. Though it would allow itself to be approached, yet when caught, it was incapable of being tamed, and would refuse nourishment till it died. The nest was made of a heap of palm leaves, raised a foot and a half from the ground, in which one egg was deposited. When the dodo finally disappeared from these islands is not known, but no traces have been found of it since the commencement of the eighteenth century.

CLASS THIRD—REPTILES.

Vertebrated animals with cold red blood, respiring by lungs; body naked or covered with scales.

In reptiles, the heart is so disposed, that at each contraction, only a portion of the blood which it receives is conveyed to the lungs; and from this it results that the action of oxygen on the blood is much less than in the mammiferous animals or birds, where all the blood is exposed to the action of the air. As respiration gives the blood its heat, and muscular fibre its susceptibility for nervous irritation, the temperature of reptiles is comparatively lower, and their muscular strength weaker than that of quadrupeds, and much less than that of birds. Their motions are chiefly confined to that of crawling and swimming; and though many at times leap and run very quickly, yet their general habits are sluggish, their sensations obtuse, their digestion slow, and in cold or temperate countries they pass almost the whole winter in a state of torpidity. The heart is composed, in frogs, of an auricle and a ventricle; in serpents, of two auricles, and a ventricle of two compartments; and in the tortoises and lizards, of two auricles and a ventricle of communicating cavities. The general resemblance in point of form, which characterizes the two preceding classes, is not applicable to the present class; for while some, as the serpents, have no members at all, others have two short legs; and the lizards, tortoises, and frogs, have four, adapted, in the two last, to progression in the water and on land. Neither is there a common external covering for the class, as fur for the quadrupeds, or feathers for the birds. Their low temperature, not differing much from the medium in which they live, renders such a covering to retain the heat unnecessary. The skin is naked in frogs, scaly in lizards and serpents, and covered with a shelly plate in the tortoises. The brain in reptiles is small, their nerves are very solid, and the relation of their sensations to a common centre seems less necessary to their animal and vital functions than the higher classes. They continue to live and possess voluntary motion for a considerable time after the brain is removed, and even when their head is cut off. The connection of the nervous system with the muscular fibre is also less necessary to its contraction; and their muscles preserve their irritability longer after being separated from the body, than in the previous classes. Even in some species, the heart beats many hours after it has been taken from the body, and the body itself continues to move for a still longer period, after the removal of this essential organ.

Reptiles possess five senses, but none of them in great perfection. Thus, their sense of touch is obtuse, from the scales, plates, or shells of some species; and even when the skin is naked, it is not adherent to the body, but envelopes it like a bag, as is seen in a frog. Sometimes, as in the serpents, their eyes have no eyelids, are often immoveable, and covered with a corneous substance; in some, three eyelids are to be distinguished; while some again appear to be destitute of sight. They have no *cochlea*, and but a small bone under the tympanum. Their nostrils are small, and their sense of smell appears weak. Their taste is not delicate, for the greater number swallow the prey whole; and in those which have the tongue soft and flexible, this organ serves chiefly for the seizure of their food. Many species of reptiles have no ribs, as the frogs; among others, as the serpents, these ribs are free, and without a sternum; in the tortoises, they are all fixed together; and in the lizard family, the ribs are disposed nearly as in the birds. The lungs are always included in the same cavity. The smallness of the pulmonary vessels permits reptiles to suspend their respiration without stopping the circulation of the blood; and thus they can remain for a long time under water with ease. The cells of their lungs are few in number, and generally large, and this organ has sometimes the form of simple sacs, scarcely cellular. They are provided with a trachea and larynx, although all have not the faculty of uttering sounds. No species of reptile is possessed of true fleshy lips. Some, as the tortoises, have a horny bill like a parrot; others have teeth of various forms, not serving, however, in general for the maceration of food, but for retaining their prey; while others, as certain serpents, have hollow fangs, which are erected when the animal opens its mouth to bite, and which insert an active poison into the wound made by these teeth. Reptiles have but one opening, for rejected solid and fluid matters, and for the organs of generation. The females have a double ovary and two oviducts, and, though oviparous, none of the species hatch their eggs. Those which couple, deposit eggs covered with a hard envelope; and the eggs of those species which do not, are soft and glaring. The greater part abandon their eggs after having deposited them in a convenient place; though some species carry them about with them. The young, on quitting the ova, appear sometimes in the form which they preserve through life; but in other cases they are, at this period of their existence, organized like fishes, are not fully developed till after a certain period, and undergo a complete metamorphosis. Such are the tadpoles of the frog. Many species of this class are used as articles of food in different countries. The use of others in the economy of nature, is apparent, in limiting the excessive reproduction of insects and worms; while they themselves, on the other hand, form the principal food of some families of birds. The poisonous species are not very numerous, and their range is daily diminishing, as cultivation and population increase.

According to the arrangement of reptiles by M. Brogniart, and followed by M. Cuvier, founded upon their organization, and which is adopted in the following summary, they are divided as noticed above, into four orders, viz. Chelonian reptiles, or tortoises; Saurian reptiles, or lizards; Ophidian reptiles, or serpents; and Batrachian reptiles, or frogs.

ORDER I.—CHELONIA.

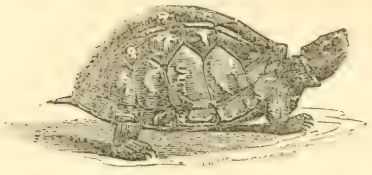
Reptiles of this order have a heart with two auricles; body enveloped in two plates or shields formed of the ribs and sternum; four feet.

THE TORTOISE.

Tortoises are usually divided into those that live upon land, and those that subsist in the water; and use has made a distinction even in the name, the one being called tortoises, the other turtles. However, Seba has proved that all tortoises are amphibious; that the land tortoise will live in the water, and that the sea turtle can be fed upon land. A land tortoise was brought to him, that was caught in one of the canals of Amsterdam, which he kept for half a year in his house, where it lived very well contented in both elements. When in the water, it remained with its head above the surface; when placed in the sun, it seemed delighted with its beams, and continued immoveable while it felt their warmth. The difference, therefore, in these animals arises rather from their habits than their conformation; and, upon examination, there will be less variety found between them than between birds that live upon land and those that swim upon the water.

All tortoises, in their external form, much resemble each other; their outward covering being composed of two great shells, the one laid upon the other, and only touching at the edges; however, when we come to look closer, we shall find that the upper shell is composed of no less than thirteen pieces. There are two holes at either edge of this vaulted body; one for a very small head, shoulders, and arms, to peep through; the other at the opposite edge, for the feet and the tail. These shells the animal is never disengaged from; and they serve for its defence against every creature but man.

LAND TORTOISES[1]



Are found of all sizes up to five feet in length from the end of the snout to the tip of the tail; and to a foot and a half across the back. It has a small head, somewhat resembling that of a serpent; an eye without the upper lid; the under eyelid serving to cover and keep that organ in safety. It has a strong, scaly tail, like the lizard. Its head the animal can put out and hide at pleasure, under the great penthouse of its shell; there it can remain secure from all attacks. As the tortoise lives wholly upon vegetable food, it never seeks the encounter; yet if any of the smaller animals attempt to invade its repose, they are sure to suffer. The tortoise, impregnably defended, is furnished with such a strength of jaw, that, though armed only with bony plates instead of teeth, wherever it fastens, it infallibly keeps its hold until it has taken out the piece.

Though peaceable in itself, it is formed for war in another respect, for it seems almost endued with immortality. Nothing can kill it; the depriving it of one of its members is but a slight injury; it will live though deprived of the brain; it will live, though deprived of its head. Tortoises are commonly known to exceed eighty years; and there was one kept in the archbishop of Canterbury's garden at Lambeth, London, that was remembered above a hundred and twenty. It was at last killed by the severity of the frost, from which it had not sufficiently defended itself in its winter retreat, which was a heap of sand at the bottom of the garden.

Though there is a circulation of blood in the tortoise, yet the animal is capable of continuing to live without continuing to breathe. In this it resembles the bat, the serpent, the mole, and the lizard; like them it takes up its dark residence for the winter, and, at that time, when its food is no longer in plenty, it happily becomes insensible to the want. But it must not be supposed that, while it is thus at rest, it totally discontinues to breathe; on the contrary, an animal of this kind, if put into a close vessel, without air, will soon be stifled; though not so readily as in a state of vigor and activity.

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[1] The genus *Testudo* has the upper shell gibbous, supported by a solid, bony frame, and joined through the greater portion of its sides to the under shell; feet with short toes united nearly to the nails, and capable, as well as the head, of being withdrawn within the shell; fore feet with five nails, those behind with four, all thick and conical.

The eggs of all the tortoise kind, like those of birds, are furnished with a yolk and a white; but the shell is different, being somewhat like those soft eggs that hens exclude before their time; however, this shell is much thicker and stronger, and is a longer time in coming to maturity in the womb. The land tortoise lays but a few in number, if compared to the sea turtle, who deposits from a hundred and fifty to two hundred in a season.

The amount of the land tortoise's eggs we have not been able to learn; but, from the scarceness of the animal, we are apt to think they cannot be very numerous. When it prepares to lay, the female scratches a slight depression in the earth, generally in a warm situation, where the beams of the sun have their full effect. There depositing her eggs, and covering them with grass and leaves, she forsakes them, to be hatched by the heat of the season. The young tortoises are generally excluded in about twenty-six days; but, as the heat of the weather assists, or its coldness retards, incubation, sometimes it happens that there is a difference of two or three days. The little animals no sooner leave the egg, than they seek for their provision, entirely self-taught; and their shell, with which they are covered from the beginning, expands and grows larger with age. As it is composed of a variety of pieces, they are all capable of extension at their sutures; and the shell admits of increase in every direction.

It is common enough to take these animals into gardens, as they are thought to destroy insects and snails in great abundance. We are even told that, in hot countries, they are admitted into a domestic state, as they are great destroyers of bugs.

THE SEA TORTOISE, OR TURTLE,[1]

As it is now called, is generally found larger than the former.

THE GREAT MEDITERRANEAN TURTLE[2]

Is the largest of the turtle kind with which we are acquainted. It is found from five to eight feet long, and from six to nine hundred pounds weight but, unluckily, its utility bears no proportion to its size, as it is unfit for food and sometimes poisons those who eat it. The shell also, which is a tough strong integument, resembling a hide, is unfit for all serviceable purposes.

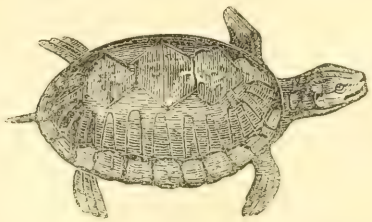
[1] The genus *Chelonia* has the feet flattened into scaly fins; toes unequal, elongated, scaly, and united by a membrane, with very small nails upon their exterior border, terminated by scaly laminæ.

[2] *Chelonia coriacca*, Cuv.

One of these animals was taken in the year 1729, at the mouth of the Loire, in France, in nets that were not designed for so large a capture. This turtle, which was of enormous strength, by its own struggles, involved itself in the nets in such a manner as to be incapable of doing mischief: yet, even thus shackled, it appeared terrible to the fishermen, who were at first for flying; but, finding it impotent, they gathered courage to drag it on shore, where it made a most horrible bellowing; and when they began to knock it on the head with their gaffs, it was to be heard at half a mile's distance. They were still further intimidated by its nauseous and pestilential breath, which so powerfully affected them that they were near fainting. This animal wanted but four inches of being eight feet long, and was about two feet over; its shell more resembled leather than the shell of a tortoise; and unlike all other animals of this kind, it was furnished with teeth in each jaw, one rank behind another, like those of a shark; its feet also, different from the rest of this kind, wanted claws; and the tail was quite disengaged from the shell, and fifteen inches long, more resembling that of a quadruped than a tortoise.

These are a formidable and useless kind, if compared to the turtle caught in the South seas and the Indian ocean. These are of different kinds; not only unlike each other in form, but furnishing man with very different advantages. They are usually distinguished by sailors into four kinds; the trunk turtle, the loggerhead, the hawksbill, and the green turtle.

THE HAWKSBILL, OR IMBRICATED TURTLE



Is the least of the four, and has a long and small mouth, somewhat resembling the bill of a hawk. The flesh of this, also, is very indifferent eating; but the shell serves for the most valuable purposes. This is the animal that supplies the tortoise shell, of which such a variety of beautiful trinkets are made.

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[1] *Chelonia imbricata*, Cuv.

But of all animals of the tortoise kind, the green turtle[1] is the most noted and the most valuable, from the delicacy of its flesh, and its nutritive qualities, together with the property of being easily digested. It is generally found about two hundred pounds in weight; though some are five hundred, and others not above fifty. Dampier mentions one so large that a boy of ten years of age, the son of Captain Rock, went from the shore in the shell of it, as a boat, to his father's ship.

This animal seldom comes from the sea but to deposit its eggs. Its chief food consists of the mangrove, the blackwood tree, and other marine plants. When the weather is fair, the turtles are sometimes seen feeding in great numbers, like flocks of sheep, several fathoms deep upon the verdant carpet below. They frequent the creeks and shallows, where they are usually taken, but they are extremely shy of boats and men, and swim remarkably fast.

ORDER II.—SAURIA.

Reptiles of this order have the body elongated, covered with scales generally with four feet; toes with claws, or at least, in part; tail more or less long; mouth armed with teeth.

THE CROCODILE.[2]

This animal grows to a great length, being sometimes found thirty feet long from the tip of the snout to the end of the tail; its most usual length, however, is eighteen. One which was dissected by the Jesuits at Siam, was eighteen feet and a half, French measure, in length; of which the tail was no less than five feet and a half, and the head and neck above two feet and a half. It was four feet, nine inches in circumference, where thickest. The fore legs had the same parts and conformation as the arms of a man both within and without. The hands, if they may be so called, had five fingers; the two last of which had no nails, and were of a conical figure. The hinder legs, including the thigh and paw, were two feet two inches long; the paws, from the joint to the extremity of the longest claws, were about nine inches; they were divided into four toes, of which three were armed with large claws, the longest of which was an inch and a half; these toes were united by a membrane, like those of a duck, but much thicker. The head was long, and had a little rising at the top; but the rest was flat, and

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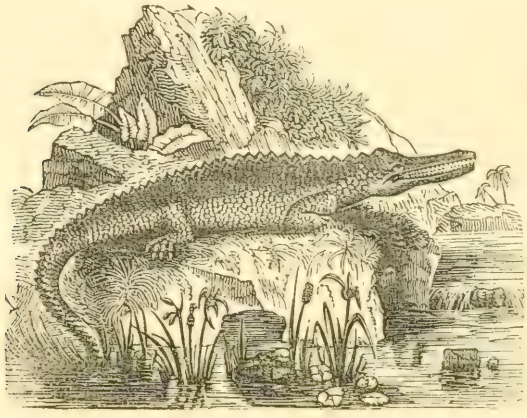
[1] *Chelonia mydas*, Cuv.

[2] The genus *Crocodilus* has the muzzle oblong and depressed; teeth unequal; legs dentated, and feet palmated, the fourth tooth in the lower jaw, on each side, lying along a groove in the upper.

especially towards the extremity of the jaws. It was covered by a skin, which adhered firmly to the skull and to the jaws. The skull was rough and unequal in several places. The eye was very small in proportion to the rest of the body. The jaws seemed to shut one upon the other; and nothing can be more false than that the animal's under jaw is without motion; it moves, like the lower jaw in all other animals, while the upper is fixed to the skull, and absolutely immoveable. The animal had twenty-seven cutting teeth in the upper jaw, and fifteen in the lower, with several void spaces between them. The distance of the two jaws, when opened as wide as they could be, was fifteen inches and a half; this is a very wide yawn, and could easily enough take in the body of a man. From the shoulders to the extremity of the tail, the animal was covered with large scales, of a square form, disposed like parallel girdles. The creature was covered not only with



these, but all over with a coat of armor; which, however, contrary to what has been commonly asserted, was not proof against a musket ball. It had no bladder; but the kidney sent the urine to be discharged by the anus. There were sixty-two joints in the back bone, which, though very closely united, had sufficient play to enable the animal to bend like a bow to the right and the left; so that what we hear of escaping the creature by turning out of the right line, and of the animal's not being able to wheel readily after its prey, seems to be fabulous.

The strength of every part of the crocodile is very great; and its arms, both offensive and defensive, irresistible. Most naturalists have remarked, from the shortness of its legs, the amazing strength of the tortoise; but what is the strength of such an animal, compared to that of the crocodile, whose legs are very short, and whose size is so superior? Its principal in-

strument of destruction is the tail; with a single blow of this, it has often overturned a canoe, and seized upon the poor savage, its conductor.

Though not so powerful, yet it is very terrible even upon land. The crocodile seldom, except when pressed by hunger, or with a view of depositing its eggs, leaves the water. Its usual method is to float along upon the surface, and seize whatever animals come within its reach; but when this method fails, it then goes closer to the bank. Disappointed of its fishy prey, it there waits, covered up among the sedges, in patient expectation of some land animal that may come to drink; the dog, the bull, the tiger, or man himself. Nothing is to be seen of the insidious destroyer as the animal approaches; nor is its retreat discovered till it be too late for safety. It seizes the victim with a spring, and goes at a bound much faster than so unwieldy an animal could be thought capable of; then, having secured the creature with both teeth and claws, it drags it into the water, instantly sinks with it to the bottom, and in this manner quickly drowns it.

The crocodile, brought into subjection, or bred up young, is used to divert and entertain the great men of the East. It is often managed like a horse; a curb is put into its mouth, and the rider directs it as he thinks proper Though awkwardly formed, it does not fail to proceed with some degree of swiftness, and is thought to move as fast as some of the most unwieldy of our own animals, the hog or the cow.

Along the rivers of Africa, this animal is sometimes taken in the same manner as the shark. Several Europeans go together in a large boat, and throw out a piece of beef upon a hook and strong fortified line, which the crocodile seizing and swallowing, is drawn along, floundering and struggling, until its strength is quite exhausted, when it is pierced in the belly, which is its tenderest part; and thus, after numberless wounds, is drawn ashore. In this part of the world, also, as well as at Siam, the crocodile makes an object of savage pomp, near the palaces of their monarchs. Phillips informs us, that at Sabi, on the Slave Coast, there are two pools of water near the royal palace, where crocodiles are bred, as they breed carp in the ponds in Europe.

There is a very powerful smell of musk about all these animals. Travellers are not agreed in what part of the body these musk-bags are contained; but the most probable opinion is, that this substance is amassed in glands under the legs and arms. The crocodile's flesh is, at best, very bad, tough eating; but, unless the musk-bags be separated, it is insupportable. The negroes themselves cannot well digest the flesh; but a crocodile's egg is to them the most delicate morsel in the world.

All crocodiles breed near fresh waters; and for this purpose the female, when she comes to lay, chooses a place by the side of a river or some fresh water lake, to deposit her brood in. She always pitches upon an extensive sandy shore, where she may dig a hole without danger of detection from the ground being fresh turned up. There she deposits from eighty to a hundred

eggs, of the size of a tennis-ball, and of the same figure, covered with a tough, white skin, like parchment. She takes above an hour to perform this task; and then covering up the place so artfully that it can scarcely be perceived, she goes back, to return again the next day. Upon her return, with the same precaution as before, she lays about the same number of eggs; and the day following also a like number. Thus, having deposited her whole quantity, and having covered them close up in the sand, they are soon vivified by the heat of the sun; and at the end of thirty days, the young ones begin to break open the shell. At this time, the female is instinctively taught that her young ones want relief; and she goes upon land, to scratch away the sand, and set them free. Her brood quickly avail themselves of their liberty; a part run unguided to the water; another part ascend the back of the female, and are carried thither in greater safety. But the moment they arrive at the water, all natural connection is at an end. The whole brood scatters into different parts of the bottom; by far the greater number are destroyed; and the rest find safety in their agility or minuteness.

The open-bellied crocodile is furnished with a false belly, like the opossum, where the young creep out and in, as their dangers and necessities require. It is probable that this open-bellied crocodile is viviparous, and fosters her young, that are prematurely excluded, in this second womb, until they come to proper maturity.

THE ALLIGATOR,[1] OR AMERICAN CROCODILE,

Which is called the cayman by the Indians, is closely allied to the preceding; the principal difference between them being that its head and part of its neck are much more smooth than those of the latter, and that its snout is more wide and flat, and more rounded at the extremity. The usual length of the alligator is seventeen or eighteen feet, but it sometimes exceeds this. This animal is a native of the warmer parts of America, in some of which it is astonishingly numerous. Its voice is loud and dreadful; and its musky scent is sometimes so powerful as to be exceedingly offensive.

The habits of the North American alligator are described with great accuracy, and in a very amusing manner, by Mr Audubon. "One of the most remarkable objects connected with the natural history of America, that attract the traveller's eye as he ascends through the mouths of the

[1] The genus *Alligator* has the muzzle broad, obtuse; teeth unequal; the fourth tooth on each side of the lower jaw entering a cavity in the upper; feet semi-palmated, and with dentations.

mighty sea-like river Mississippi, is the alligator. There, along the muddy shores, and on the large floating logs, these animals are seen lying stretched at full length, basking and asleep, or crossing to and fro the stream in search of food, with the head only out of the water. It is here neither wild nor shy; nor is it the very dangerous animal represented by travellers. But, to give you details that probably may not be uninteresting, I shall describe their more private haunts, and relate what I have experienced and seen respecting them in their habits.

"In Louisiana, all our lagoons, bayous, creeks, ponds, lakes, and rivers, are well stocked with them; they are found wherever there is a sufficient quantity of water to hide them, or to furnish them with food; and they continue thus, in great numbers, as high as the mouth of the Arkansas river, extending east to North Carolina, and as far west as I have penetrated.

On the Red river, before it was navigated by steam vessels, they were so extremely abundant that, to see hundreds at a sight along the shores, or on the immense rafts of floating or stranded timber, was quite a common occurrence, the smaller on the backs of the larger, groaning and uttering their bellowing noise, like thousands of irritated bulls about to meet in fight, but all so careless of man that, unless shot at, or positively disturbed, they remained motionless, suffering boats or canoes to pass within a few yards of them, without noticing them in the least. The shores are yet trampled by them in such a manner, that their large tracks are seen as plentiful as those

of sheep in a fold. It was on that river, particularly, thousands of the largest size were killed, when the mania of having shoes, boots, or saddle-seats made of their hides, lasted. It had become an article of trade, and many of the squatters and strolling Indians followed for a time no other business. The discovery that their skins are not sufficiently firm and close-grained to prevent water, or dampness long, put a stop to their general destruction, which had already become very apparent. The leather prepared from these skins was handsome and very pliant, exhibiting all the regular lozenges of the scales, and able to receive the highest degree of polish and finishing.

"The usual motion of the alligator, when on land, is slow and sluggish; it is a kind of labored crawling, performed by moving alternately each leg, in the manner of a quadruped when walking, scarce able to keep up their weighty bodies from dragging on the earth, and leaving the track of their long tail on the mud, as if that of the keel of a small vessel. Thus they emerge from the water, and go about the shores and the woods, or the fields, in search of food, or of a different place of abode, or one of safety to deposit their eggs. If, at such times, when at all distant from the water, an enemy is perceived by them, they droop and lie flat, with the nose on the ground, watching the intruder's movements with their eyes, which are able to move considerably round, without affecting the position of the head. Should a man then approach them, they do not attempt either to make away or attack, but merely raise their body from the ground for an instant, swelling themselves, and issuing a dull blowing, not unlike that of a blacksmith's bellows. Not the least danger need be apprehended; then you may either kill them with ease, or leave them. But, to give you a better idea of the slowness of their movements and progress of travels on land, when arrived at a large size, say twelve or fifteen feet, believe me when I tell you, that having found one in the morning, fifty yards from a lake, going to another in sight, I have left him unmolested, hunted through the surrounding swamps all the day, and met the same alligator within five hundred yards of the spot, when returning to my camp at dusk. On this account they usually travel during the night, they being then less likely to be disturbed, and having a better chance to surprise a litter of pigs, or of land tortoises, for prey.

"The power of the alligator is in his great strength; and the chief means of his attack or defence is his large tail, so well contrived by nature to supply his wants, or guard him from danger, that it reaches, when curved into half a circle, his enormous mouth. Woe be to him who goes within the reach of this tremendous thrashing instrument; for no matter how strong or muscular—if human, he must suffer greatly, if he escapes with life. The monster, as he strikes with this, forces all objects within the circle towards his jaws, which, as the tail makes a motion, are opened to their full stretch, thrown a little sideways, to receive the object, and, like battering-rams, to bruise it shockingly in a moment.

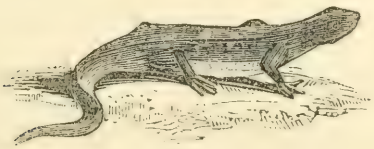
"The alligator, when after prey in the water, or at its edge, swims so slowly towards it, as not to ruffle the water. It approaches the object sideways, body and head all concealed, till sure of his stroke; then, with a tremendous blow, as quick as thought, the object is secured, as I described before."

THE LIZARD.[1]

The color of these animals is very various, as they are found of a hundred different hues; green, blue, red, chesnut, yellow, spotted, streaked, and marbled. Were color alone capable of constituting beauty, the lizard would often please; but there is something so repulsive in the animal's figure, that the brilliancy of its scales, or the variety of its spots, only tend to give an air of more exquisite venom, of greater malignity. The figure of these animals is not less various; sometimes swollen in the belly, sometimes pursed up at the throat; sometimes with a rough set of spines on the back, like the teeth of a saw; sometimes with teeth, at others with none; sometimes venomous, at others harmless, and even philanthropic; sometimes smooth and even; sometimes with a long, slender tail; and often with a shorter blunt one.

But their greatest distinction arises from their manner of bringing forth their young; some of them are viviparous; some are oviparous; and some bring forth small spawn, like fishes.

THE GREEN LIZARD[2]



Is seen in its greatest brilliancy about the beginning of spring; when, after having thrown off its old covering, it exposes its new skin, with all its bright enamelled scales, to the genial warmth of the sun's rays, which, playing on the scales, gild them with undulating reflections. The upper parts of the

[1] The genus *Lacerta* has the palate armed with two rows of teeth; a collar on the under side of the neck, formed by a transverse row of large scales, separated from those of the belly by very small ones; bone of the cranium projected on the temples and orbits.

[2] *Lacerta viridis*, Daud.

body are of a beautiful green, more or less variegated with yellow, gray brown, and even sometimes with red; the under parts being always more of a whitish color. The colors of this species are subject to variety, becoming pale at certain seasons of the year, and more particularly after the death of the animal. It is chiefly in the warm countries that it shines with all its superb ornaments, like gold and precious stone. In those regions it grows to a larger size than in more temperate countries, being sometimes found thirty inches in length. The inhabitants of Africa eat the flesh of this animal. It is a gentle creature, and, if taken when young, may be rendered tame. If irritated, however, and driven to extremity, it will defend itself against a dog, and will fasten so firmly on his muzzle, as to allow itself to be killed, rather than forego its hold.

The green lizard is by no means confined to the warmest countries of both continents; it is found likewise in temperate regions, though it is there smaller and less numerous. It is not even unknown in Sweden, and in Kamtschatka; and in both countries, in spite of its beautiful appearance, it is looked on by the inhabitants with horror, from some strange superstitious prejudices.

THE IGUANA

Is about three feet long, and the body about as thick as one's thigh. The skin is covered with small scales, like those of a serpent; and the back is furnished with a row of prickles that stand up, like the teeth of a saw. Both the jaws are full of very sharp teeth, and the bite is dangerous, though not venomous. The male has a skin hanging under his throat, which reaches down to his breast; and when displeased, he puffs it up like a bladder; he is one third larger and stronger than the female though the strength of either avails them little towards their defence. The males are ash colored, and the females are green.

The flesh of these may be considered as the greatest delicacy of Africa and South America; and the sportsmen of those climates go out to hunt the iguana, as we do in pursuit of the pheasant or the hare. In the beginning of the season, when the great floods of the tropical climates are passed away, and vegetation starts into universal verdure, the sportsmen are seen, with a noose and a stick, wandering along the sides of the rivers, to take the iguana. This animal, though apparently formed for combat, is the most harmless creature of all the forest.

· *Iguana vulgaris*, Lin. The genus *Iguana* has the body and tail covered with small imbricated scales; a row of spines, or impressed and pointed scales along the back; throat with a pendent and inflated skin, compressed laterally; femoral pores; head plated; a row of compressed triangular and serrated teeth around the jaws, and two little rows on the posterior margin of the palate.

THE CHAMELEON,[1]

Like the crocodile, this little animal proceeds from an egg; and it also nearly resembles that formidable creature in form. It is found in all the warm countries, both of the old and the new world.

The head of a large chameleon is almost two inches long; and thence to the beginning of the tail, four and a half; the tail is five inches long, and the feet two and a half; the thickness of the body is different at different times; for sometimes, from the back to the belly it is two inches, and sometimes but one; for it can blow itself up, and contract itself at pleasure. This swelling and contraction is not only of the back and belly, but of the legs and tail.

The chameleon has the power of driving the air it breathes, over every part of the body; however, it only gets between the skin and the muscles; for the muscles themselves are never swollen. The skin is very cold to the touch; and though the animal seems so lean, there is no feeling the beating of the heart. The surface of the skin is unequal, and has a grain not unlike shagreen, but very soft, because each eminence is as smooth as if it were polished. The color of all these eminences, when the chameleon is at rest in a shady place, is of a bluish gray; and the space between is of a pale red and yellow.

But when the animal is removed into the sun, then comes the wonderful part of its history. At first, it appears to suffer no change of color, its grayish spots still continuing the same; but the whole surface soon seems to imbibe the rays of light; and the simple coloring of the body changes into a variety of beautiful hues. Wherever the light comes upon the body, it is of a tawny brown; but that part of the skin on which the sun does not shine, changes

[1] The genus *Chameleon* has the body shagreened with small scaly granules, compressed, and the back edged; tail round and prehensile; five toes on all the feet, but divided into two sets, the one of three toes, the other of two, each united by a membrane to the nails; tongue fleshy, cylindrical, and extremely extensible; teeth tri-lobed; eyes large, but almost covered by skin, and with separate movements; no external ear; occiput pyramidal; lungs very large.

into several brighter colors, pale yellow, or vivid crimson, which form spots of the size of half one's finger; some of these descend from the spine half way down the back; and others appear on the sides, arms, and tail. Sometimes the animal becomes all over spotted with brown spots, of a greenish cast. When it is wrapped up in a white linen cloth for two or three minutes, the natural color becomes much lighter, but not quite white, as some authors have pretended; however, it must not hence be concluded that the chameleon assumes the color of the objects which it approaches; this is entirely an error, and probably has taken its rise from the continual changes it appears to undergo.

When the chameleon changes place, and attempts to descend from an eminence, it moves with the utmost precaution, advancing one leg very deliberately before the other, still securing itself by holding whatever it can grasp by the tail. It seldom opens the mouth, except for fresh air; and, when that is supplied, discovers its satisfaction by its motions, and the frequent changes of its color. The tongue is sometimes darted out after its prey, which are flies; and this is as long as the whole body. The eyes are remarkably little, though they stand out of the head; but the most extraordinary part of their conformation is, that the animal often moves one eye, when the other is entirely at rest; nay, sometimes one eye will seem to look directly forward, while the other looks backward; and one will look upwards, while the other regards the earth.

ORDER III.—OPHIDIA.

The ophidia, or serpents, have a heart with two auricles; body much elongated, cylindrical, destitute of feet, generally covered with scales.

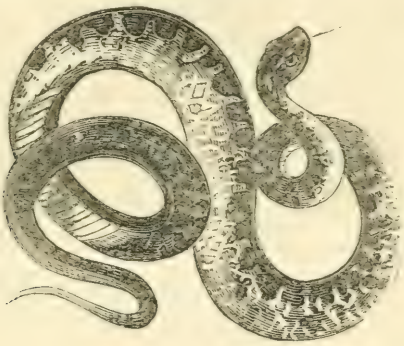
THE BOA CONSTRICTOR.[1]

The ground color of the body of the great boa, which is the largest and strongest of the serpent race, is yellowish gray, on which is distributed, along the back, a series of large, chain-like, reddish brown, and sometimes perfectly red variations, with other small and more irregular marks and spots.

The great boa is frequently from twenty-five to thirty feet in length, and of a proportionate thickness. The rapacity of these creatures is often their own destruction; for whenever they seize and swallow their prey, they seem like surfeited gluttons, unwieldy, stupid, helpless, and sleepy. They at the same time seek for some retreat, where they may lurk for several

[1] The genus *Boa* has the anus with a hook on each side; body compressed, thickest in the middle; tail prehensile; scales small, at least upon the posterior part of the head.

days together, and digest their meal in safety. The smallest effort will then destroy them; they scarcely can make any resistance; and, equally unqualified for flight or opposition, even the naked Indians do not fear to assail them. But it is otherwise, when this sleeping interval of digestion is over; they then issue, with famished appetites, from their retreats, and with accumulated terrors, while every animal of the forest flies from their presence. One of them has been known to kill and devour a buffalo. Having darted upon the affrighted beast, (says the narrator,) the serpent instantly began to wrap him round with its voluminous twistings; and at every twist the bones of the buffalo were heard to crack as loud as the report of a gun. It was in vain that the animal struggled and bellowed; its enormous enemy entwined it so closely, that at length all its bones were crushed to pieces, like those of a malefactor on the wheel, and the whole

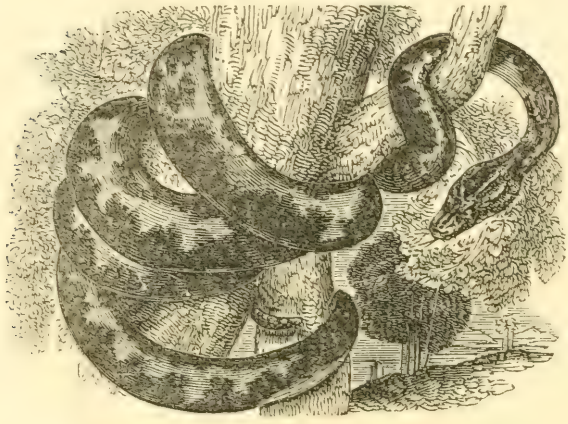


body was reduced to one uniform mass; the serpent then untwined its folds, in order to swallow its prey at leisure. To prepare for this, and also to make it slip down the throat more smoothly, it was seen to lick the whole body over, and thus to cover it with a mucilaginous substance. It then began to swallow it, at the end that offered the least resistance; and in the act of swallowing, the throat suffered so great a dilatation, that it took in at once a substance that was thrice its own thickness.

This animal inhabits India, Africa, and South America. With respect to their conformation, all serpents have a very wide mouth, in proportion to the size of the head; and, what is very extraordinary, they can gape and swallow the head of another animal which is three times as big as their own. To explain this, it must be observed, that the jaws of this animal do not open as ours, in the manner of a pair of hinges, where bones are applied to bones, and play upon one another; on the contrary, the serpent's jaws are held together at the roots by a stretching muscular skin; by which means they open as widely as the animal chooses to stretch them, and admit of a prey much thicker than the snake's own body. The throat, like stretching lea-

.her, dilates to admit the morsel; the stomach receives it in part; and the rest remains in the gullet, till putrefaction and the juices of the serpent's body unite to dissolve it.

THE ANACONDA[1]



Inhabits Surinam. He is twenty feet in length, of a bright brown color, with a double row of deep brown round spots along the back, and ocellated spots on the sides. The name of *anaconda* has been popularly applied to all serpents of enormous size.

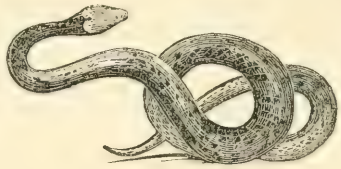
THE BLACK, OR RINGED SNAKE[2]

Is the largest of English serpents, sometimes exceeding four feet in length. The neck is slender, the middle of the body thick, the back and sides covered with small scales; the belly with oblong, narrow, transverse plates; the color of the back and sides is of a dusky brown; the middle of the back marked with two rows of small black spots, running from the head to the tail; the plates on the belly are dusky; the scales on the sides are of a bluish white; the teeth are small and serrated, lying on each side of the

[1] *Boa scytale*, Lin.

[2] *Coluber natrix*, Lin. The genus *Coluber* has transverse plates on the belly, divided into two under the tail, or forming a double row; head flattened, with nine large plates; teeth almost equal; no poison fangs.

jaw, in two rows. The whole species is perfectly inoffensive, taking shelter in dunghills, and among bushes in moist places; whence they seldom



remove, unless in the midst of the day, in summer, when they are invited out by the heat, to bask themselves in the sun.

This snake preys upon frogs, insects, worms, mice, and young birds.

THE BLACK SNAKE

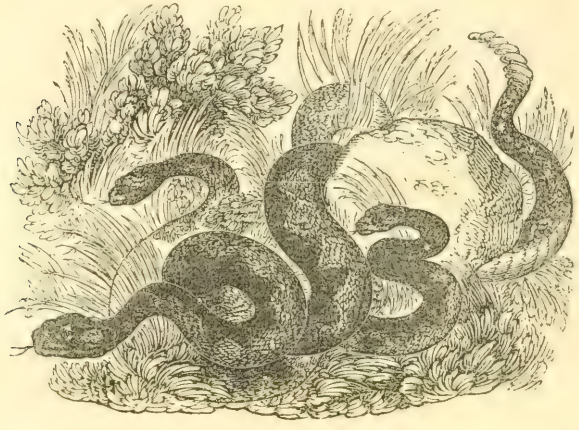
Of the United States, which is larger than the above, and generally grows to six feet long, takes a prey proportionable to its size—squirrels and small birds. It is sometimes found in the neighborhood of the hen-roost, and will devour the eggs, even while the hen is sitting upon them. But its usual haunts are meadows and dry thickets. It may be often seen among whortleberry bushes, waiting to make a prey of the birds that are hopping among them. Its color is a glossy black, sometimes tinged with blue. It seizes its prey with great quickness, and kills it by coiling round the body in the manner of the boa constrictor.

THE RATTLESNAKE[1]

Is found in North and South America, and in no part of the old world. Some are as thick as a man's arm, and six feet in length; but the most usual size is from four to five feet long. In most particulars it resembles the viper; it differs, however, in having a large scale, which hangs like a penthouse over each eye. They are of an orange tawny, and blackish color on the back; and of an ash color on the belly, inclining to lead. The male may be readily distinguished from the female, by a black velvet spot on the

[1] *Crotalus horridus*, Lin. The genus *Crotalus* has the head broad, triangular, and flattened; scales carinated; tongue forked; a hollow behind the nostrils; upper maxillary bones with isolated fangs; plates, or transverse bands under the body and tail; extremity of the tail with a rattle, formed of hollow, moveable and sonorous plates.

head, and by the head being smaller and longer. But that which, besides their superior malignity, distinguishes them from all other animals, is their rattle an instrument lodged in their tail, by which they make such a loud, rattling noise, when they move, that their approach may readily be perceived, and the danger avoided. This rattle, which is placed in the tail, somewhat resembles, when taken from the body, the curb chain of a bridle; it is composed of several thin, hard, hollow bones, linked on each other, and rattling upon the slightest motion. It is supposed by some that the snake acquires an additional bone every year; and that from this its age may be precisely known; however this may be, certain it is, that the young snakes of a year or two old, have no rattles at all; while many old ones have been killed, that had from eleven to thirteen joints each They shake and make



a noise with these rattles, with prodigious quickness when they are disturbed; however, the peccary and the vulture are no way terrified at the sound, but hasten at the signal, to seize the snake, as their most favorite prey.

It is very different with almost every other animal. The certain death which ensues from this terrible creature's bite, makes a solitude wherever it is heard. It moves along most majestically; neither seeking to offend the larger animals, nor fearing their insults. If unprovoked, it never meddles with any thing but its natural prey; but when accidentally trodden upon, or pursued to be destroyed, it then makes a dreadful and desperate defence. It erects itself upon its tail, throws back its head, and inflicts the wound in a moment; then parts, and inflicts a second wound; after which, we are told by some, that it remains torpid and inactive, without even attempting to escape.

The very instant the wound is inflicted, though small in itself, it appears more painful than the sting of a bee. This pain, which is so suddenly felt, far from abating, grows every moment more excruciating and dangerous; the limb swells; the venom reaches the head, which is soon of a monstrous size; the eyes are red and fiery; the heart beats quick, with frequent interruptions; the pain becomes insupportable, and some expire under it in five or six hours; but others, who are of stronger constitutions, survive the agony for a few hours longer, only to sink under a general mortification which ensues and corrupts the whole body.

The usual motion of the rattlesnake is with its head to the ground. When, however, it is alarmed, it coils its body into a circle, with its head erect, and its eyes flaming in a terrific manner. But it cannot pursue rapidly, and has no power of springing on its enemy.

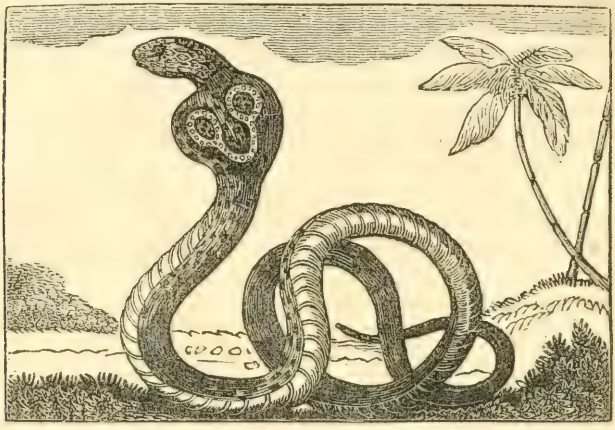
Rattlesnakes are viviparous, producing their young, generally about twelve in number, in the month of June, and by September these acquire the length of twelve inches. It has been well attested that they adopt the same mode of preserving their young from danger as that attributed to the common viper, receiving them into their mouth and swallowing them. It is believed by some naturalists to have the power of fascinating its prey by gazing at it, so as to render it incapable of flight; but others are doubtful as to this being a fact. The probability seems to be, that the victim is prevented from escaping merely by the extreme terror which its formidable enemy inspires.

THE COBRA DE CAPELLO, OR HOODED SERPENT,[1]

inflicts the most deadly and incurable wounds. Of this formidable creature there are five or six different kinds; but they are all equally dangerous, and their bite is followed by speedy and certain death. It is from three to eight feet long, with two large fangs hanging out of the upper jaw. It has a broad neck, and a mark of dark brown on the forehead; which, when view-

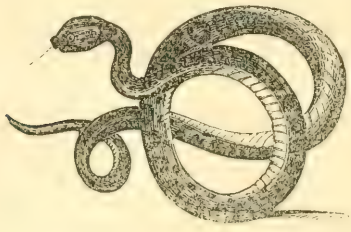
[1] *Naia vulgaris*, Lin. The genus *Naia* has plates larger on the body near the head; the head covered with large plates, and hind head furnished with a hood; poisonous fangs in the upper jaw.

ed frontwise, looks like a pair of spectacles; but behind, like the head of a cat. The eyes are fierce, and full of fire; the head is small, and the nose



flat, though covered with very large scales, of a yellowish ash color; the skin is white, and the large tumor on the neck is flat, and covered with oblong, smooth scales.

THE EGYPTIAN VIPER.[1]



This is said to be the officinal viper of the Egyptians, and is, by some, supposed to be the asp of Cleopatra, by the bite of which that high-spirited princess determined to die rather than submit to be carried to Rome in order to grace the triumph of Augustus. It is imported in considerable quantities every year to Venice, for the use of the apothecaries in the composition of theriaca, and for other purposes. It is abundant in Egypt; and is found in other parts of Africa as well as in Asia. It is from twenty

[1] *Naia haje*, Lin.

inches long to three feet and upwards, variegated with rich chestnut brown spots or bands, on a lighter brown ground, the scales remarkably short, close set, and hard; the eyes are vertical; the head compressed, and covered with very minute dark brown scales, and reddish stripes.

THE VIPER.[1]

The common viper[2] is a native of many parts of Europe; but the dry, stony, and in particular the chalky countries, abound with them. In the East Indies, also, it is found, and varies very slightly from that which belongs to Europe. It can equally support the vicissitudes of very cold climates, it being an inhabitant of Sweden, where its bite is nearly as dangerous as in the warmer regions of Europe; and likewise of Russia, and of several parts of Siberia, where it is very numerous, as the superstitions of the people deter them from endeavoring to destroy this noxious reptile, because that they conceive some terrible disaster will follow the attempt. This animal seldom grows to a greater length than two feet; though sometimes they are found above three. The ground color of their bodies is a dirty yellow; that of the female is deeper. The back is marked the whole length with a series of rhomboid black spots, touching each other at the points; the sides with triangular ones; the belly entirely black. It is chiefly distinguished from the common ringed snake by the color, which in the latter is more beautifully mottled; as well as by the head, which is thicker than the body; but particularly by the tail, which, in the viper, though it ends in a point, does not run tapering to so great a length as in the other. When, therefore, other distinctions fail, the difference of the tail can be discerned at a single glance.

The viper differs from most other serpents in being much slower, as also, in excluding its young completely formed, and bringing them forth alive. The kindness of Providence seems exerted not only in diminishing the

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[1] The genus *Vipera* has scales on the head rough or granulated; plates under the belly divided into two under the tail; poisonous fangs in the upper jaw.

[2] *Vipera Berus*, Cuv.

speed, but also the fertility, of this dangerous creature. They couple in May, and are supposed to be about three months before they bring forth, and have seldom above eleven eggs at a time. These are of the size of a blackbird's egg, and chained together in the womb like a string of beads. Each egg contains from one to four young ones; so that the whole of a brood may amount to about twenty or thirty. They continue in the womb till they come to such perfection as to be able to burst from the shell; and they are said to creep from their confinement by their own efforts into the open air, where they continue for several days without taking any food whatsoever. When they are in danger, they retreat into the mouth of the mother.

The viper is capable of supporting very long abstinence, it being known that some have been kept in a box six months without food; yet during the whole time they did not abate of their vivacity. They feed only a small part of the year, but never during their confinement; for if mice, their favorite diet, should at that time be thrown into their box, though they will kill, yet they will never eat them. When at liberty, they remain torpid throughout the winter; yet, when confined, have never been observed to take their annual repose.

Vipers crawl slowly at all times, and in general only attack such smaller animals as are their usual food. They never willingly assail man or the larger animals, except when wounded, trampled on, or irritated, when they become furious, and are apt to bite severely. From the firmer manner in which their spine is articulated, they are unable to twist themselves round so much as most other serpents. It is only the head that they can turn with any considerable degree of agility; owing to this circumstance, they are easily taken. For this purpose, some persons use a forked stick, to fix the viper by the neck; and then, seizing it by the tail, throw it into a bag. Others, holding down its head with the end of a stick, take it fast in the left hand by the neck; and while the animal makes ineffectual efforts to defend itself, with its mouth wide open, cut out its poisonous fangs with a pair of scissors or a knife; the viper, after this, is incapable of doing injury, and may be handled with perfect safety. The English viper-catchers have the boldness to seize them suddenly by the neck, or even by the tail, with their hands; and holding them with a firm grasp, the animal is altogether incapable of turning itself sufficiently to bite the hand that holds it fast.

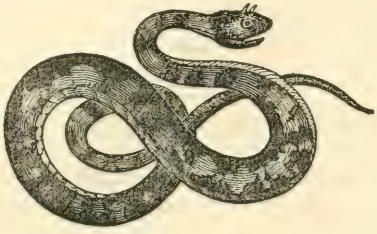
THE HORNED VIPER.[1]

The cerastes, or horned viper, which commonly grows to the length of about a foot or fifteen inches, but sometimes more than two feet, is distinguished by a pair of horns or curved processes, situated above the eyes, and

[1] *Vipera cerastes*, Cuv.

pointing forward; these horns have nothing analogous in their structure to the horns of quadrupeds, and are by no means to be considered in the light of either offensive or defensive weapons; they are moveable, and about one sixth of an inch long.

The head of the cerastes is flattened; the muzzle thick and short; the eye yellowish green. The hind part of the head is narrower than the part of the body to which it is attached. The scales of the head are of the same size with those on the back, or only a little less; and all the scales are oval



with a longitudinal ridge. The general color of the back is yellowish, with irregular spots of different degrees of darkness, in form of transverse bands. The under surface of the body is brighter. The cerastes inhabits the greatest part of the eastern continent, especially the desert sandy part of it. It abounds in the three Arabias, and in Africa. In Egypt, it appears to be partially domesticated, as it will enter the houses when the family are at table, pick up the scattered crumbs, and retire without doing injury to any one.

This animal can endure hunger and thirst much longer than most serpents; some naturalists assert that it can exist five years without nourishment.

THE AMPHISBÆNA.[1]

This genus grows usually to the length of one or two feet, of which the tail never exceeds an inch, or an inch and a quarter. It is from the extremities of its body being of an equal thickness its being supposed to crawl in both directions, that it derives its name. The eyes are exceedingly small, and covered in such a manner by a membrane, as to be hardly perceptible; from which circumstance it has been called the blind serpent. The top of the head is covered by six large scales, in three rows of two each; and the body is entirely covered with smooth scales of an almost square form, arranged in regular transverse rings. It has a hard skin of an earthy color.

[1] The genus *Amphisbæna* has the body surrounded with circular rows of quadrangular scales; a row of pores before the anus; teeth not numerous, conical in the jaws only; oviparous.

This animal is found in India, particularly the isle of Ceylon; and likewise in South America. Its habits are in a great measure unknown; but it feeds on earthworms, beetles, and various insects; it is particularly fond of devouring ants, which in numberless legions often destroy all before them, leaving every thing desolate as if destroyed by fire. Having the power of advancing or withdrawing itself without injury, in consequence of its structure, this serpent is peculiarly fitted for penetrating into the subterraneous retreats of ants, worms, and other insects; and is able to dig deeper than any other serpent, its skin being very hard, and its muscles very strong. The amphisbæna is not venomous.

ORDER IV.—BATRACHIA.

Reptiles of this order have a heart with one auricle; body covered with a naked skin; lungs two when mature, but with bronchiæ like fishes in their early stage.

THE FROG.[1]

If we examine this animal internally, we shall find that it has very little brain for its size; a very wide swallow; a stomach seemingly small, but capable of great distention. The heart in the frog, as in all other animals that are truly amphibious, has but one ventricle; so that the blood can circulate without the assistance of the lungs, while it keeps under water. The lungs resemble a number of small bladders joined together, like the cells of a honey-comb; they are connected to the back by muscles, and can be distended or exhausted at the animal's pleasure. Neither male nor female have any of the external instruments of generation; the anus serving for that purpose in both. Such are the most striking peculiarities in the anatomy of a frog; and in these it agrees with the toad, the lizard, and the serpent.

[1] The characteristics of the genus *Rana*, or frog, are a body slender; hind feet very long, muscular, and completely palmated; skin smooth; upper jaw furnished with a row of small teeth and an interrupted transverse one in the middle of the palate; males with a thin membrane under the ear, which is inflated with air when they cry.

The female is impregnated neither by the mouth, as some philosophers imagine, nor by the excrescence at the thumbs, as was the opinion of Linnæus; but by the inspersion of the male seminal fluid upon the eggs as they proceed from the body.

A single female produces from six to eleven hundred eggs at a time; and, in general, she throws them all out together by a single effort; though sometimes she is an hour in performing this task. It is generally in March that she deposits the ova, or spawn.

When the spawn is emitted and impregnated by the male, it drops to the bottom. The eggs, which during the four first hours suffer no perceptible change, begin then to enlarge and grow lighter; by which means they mount to the surface of the water. The twenty-first day, the egg is seen to open a little on one side, and the beginning of a tail to peep out, which becomes more and more distinct every day. The thirty-ninth day, the little animal begins to have motion; it moves at intervals its tail; and it is perceived that the liquor in which it is circumfused, serves it for nourishment. In two days more, some of these little creatures fall to the bottom; while others remain swimming in the fluid round them, while their vivacity and motion is seen to increase. Those which fall to the bottom remain there the whole day; but having lengthened themselves a little, for hitherto they are doubled up, they mount at intervals to the mucus, which they had quitted, and are seen to feed upon it with great vivacity. The next day they acquire their tadpole form. In three days more, they are perceived to have two little fringes, that serve as fins, beneath the head; and these in four days after assume a more perfect form. It is then also that they are seen to feed very greedily upon the pond-weed. When ninety-two days old, two small feet are seen beginning to sprout near the tail; and the head appears to be separate from the body. In five days after this, they refuse all vegetable food; their mouth appears furnished with teeth; and their hinder legs are completely formed. In this state it continues for about six or eight hours; and then the tail dropping off by degrees, the animal appears in its most perfect form.

Thus the frog, in less than a day, having changed its figure, is seen to change its appetites also. As soon as the animal acquires its perfect state, from having fed upon vegetables it becomes carnivorous, and lives entirely upon worms and insects. But, as the water cannot supply these, it is obliged to quit its native element, and seek for food upon land, where it lives by hunting worms and taking insects by surprise.

The frog lives for the most part out of the water; but when the cold nights begin to set in, it returns to its native element, always choosing stagnant waters, where it can lie without danger, concealed at the bottom. In this manner it continues torpid, or with but very little motion, all the winter; like the rest of the dormant race, it requires no food; and the circulation is slowly carried on, without any assistance from the air. In the

countries round Hudson's Bay, it is often found frozen hard, in which state it is as brittle as glass; yet, by wrapping it in warm skins, and exposing it to a slow fire, it will return to life.

The difference of sexes, which was mentioned above, is not perceivable in these animals, until they have arrived at their fourth year; nor do they begin to propagate, till they have completed that period. By comparing their slow growth with their other habitudes, it would appear, that they live about twelve years; but having so many enemies, both by land and water, it is probable that few of them arrive at the end of their term.

Frogs live upon insects of all kinds; but they never eat any, unless they have motion. They continue fixed and immoveable till their prey appears; and just when it comes sufficiently near, they jump forward with great agility, dart out their tongues, and seize it with certainty. The tongue in this animal, as in the toad, lizard, and serpent, is extremely long, and formed in such a manner that it swallows the point down its throat; so that a length of tongue is thus drawn out, like a sword from its scabbard, to assail its prey. This tongue is furnished with a glutinous substance; and whatever insect it touches infallibly adheres, and is thus held fast till it is drawn into the mouth.

The croaking of frogs is well known, whence in some countries they are distinguished by the ludicrous title of Dutch nightingales. The large water or bull frogs of the northern countries have a note as loud as the bellowing of a bull; and, for this purpose, puff up the cheeks to a surprising magnitude. Of all frogs, however, the male only croaks; the female is silent; before wet weather, their voices are in full exertion; they are then heard with unceasing assiduity, sending forth their call, and welcoming the approaches of their favorite moisture. No weather-glass was ever so true as a frog, in foretelling an approaching change. This may probably serve to explain an opinion which some entertain, that there is a month in the year, called Paddock Moon, in which the frogs never croak: the whole seems to be no more than that, in the hot season, when the moisture is dried away, and consequently, when these animals neither enjoy the quantity of health nor food that at other times they are supplied with, they show by their silence how much they are displeased with the weather.

As frogs adhere closely to the backs of their own species, so it has been found, by repeated experience, they will also adhere to the backs of fishes. Few that have ponds, but know that these animals will stick to the backs of carp, and fix their fingers in the corner of each eye. In this manner they are often caught together; the carp blinded, and wasted away.

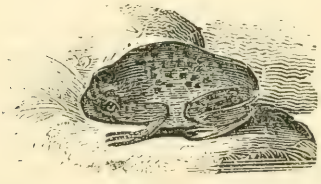
THE EDIBLE FROG,[1]

Which is considerably larger than the common species, is rare in England, but is abundant in Italy, France, and Germany, where its hind quarters are looked upon as a delicacy. It is of an olive green hue, marked with black patches on its back, and on its limbs with black transverse bars.

THE TREE FROG.[2]

The tree frog is small, slender, and elegantly made; green in all the upper parts, whitish in the abdomen, and reddish on the under surface of the limbs. In summer it resides principally on the upper branches of trees, where it feeds on insects, which it catches very dexterously. It is remarkable for its power of absorbing water. It is found in France, Germany, and Italy, and other European countries, and in various parts of America, but not in Great Britain.

THE TOAD.[3]



As the toad bears a general resemblance in figure to the frog, so also it resembles that animal in its nature and appetites. When, like the frog, these animals have undergone all the variations of their tadpole state, they forsake the water, and are often seen in a moist summer's evening, crawling up, by myriads, from fenny places, into drier situations. There, having

[1] *Rana esculenta*, Lin.

[2] *Hyla arborea*, Lin. The genus *Hyla* has the body slightly compressed, elongated, smooth; tongue short and thick; the two fore feet furnished with four toes, the hinder with five, all without claws, but terminated by lenticular tubercles; male with a gular pouch, capable of inflation.

[3] *Bufo vulgaris*, Lin. The genus *Bufo* has the body thick, short, and broad, covered above with warts or papillæ, which exude a fetid fluid; a thick projection behind the ears; no teeth; eyes large and protuberant; fore feet with four toes separate; hind feet short, with five toes, generally palmated.

found out a retreat, or having dug themselves one with their mouth and hands, they lead a patient, solitary life, seldom venturing out, except when the moisture of a summer's evening invites them abroad. At that time the grass is filled with snails, and the pathways covered with worms, which make their principal food. Insects also, of every kind, they are fond of: and we have the authority of Linnæus for it, that they sometimes continue immoveable, with the mouth open, at the bottom of shrubs, where the butterflies, in some measure fascinated, are seen to fly down their throats.

The toad, contrary to vulgar prejudice, is a harmless, defenceless creature, torpid and unvenomous, and seeking the darkest retreats, not from the malignity of its nature, but the multitude of its enemies.

Like all of the frog kind, the toad is torpid in winter. It chooses then for a retreat either the hollow root of a tree, the cleft of a rock, or sometimes the bottom of a pond, where it is found in a state of seeming insensibility. As it is very long-lived, it is very difficult to be killed; its skin is tough, and cannot be easily pierced; and, though covered with wounds, the animal continues to show signs of life, and every part appears in motion. But what shall we say to its living for centuries lodged in the bosom of a rock, or cased within the body of an oak tree, without the smallest access on any side, either for nourishment or air, and yet taken out alive and perfect! Stories of this kind, it would be as rash to contradict, as it is difficult to believe; we have the highest authorities bearing witness to their truth, and yet, the whole analogy of nature seems to arraign them of falsehood. Bacon asserts, that toads are found in this manner; Dr Plot asserts the same; there is, to this day, a marble chimney-piece at Chatsworth, with the print of the toad upon it, and tradition of the manner in which it was found. In the Memoirs of the Academy of Sciences, there is an account of a toad found alive and healthy in the heart of a very thick elm, without the smallest entrance or egress. In the year 1731, there was another found near Nantz, in the heart of an old oak, without the smallest issue to its cell; and the discoverer was of opinion, from the size of the tree, that the animal could not have been confined there less than eighty or a hundred years, without sustenance and without air.

Of this animal there are several varieties; such as the water and the land toad, which probably differ only in the ground color of their skin.

THE SURINAM TOAD.[1]

This animal is in form more hideous than even the common toad. The body is flat and broad; the head small; the jaws, like those of the mole,

[1] *Pipa Surinamensis*, Shaw. The characteristics of this genus, are a body flattened horizontally; head large and triangular; tongue wanting; tympanum concealed under the skin; eyes small, towards the margin of the upper jaw; toes of the fore feet cleft into four small points; larynx of the male very long, triangular.

are extended, and evidently formed for rooting in the ground; the skin of the neck forms a sort of wrinkled collar; the color of the head is of a dark chesnut, and the eyes are small; the back, which is very broad, is of a lightish gray, and seems covered over with a number of small eyes, which are round, and placed at nearly equal distances. These eyes are very different from what they seem; they are the animal's eggs covered with their shells, and placed there for hatching. They are generated within the female, who drops them on the ground. The male then collects them, and deposits them carefully on the back of the female, where, after impregnation, they are pressed into the cellules, which close upon them. These eggs are buried deep in the skin, and in the beginning of gestation but just appear; and are very visible when the young animal is about to burst from its confinement They are of a reddish, shining yellow color; and the spaces between them are full of small warts, resembling pearls.

In this manner the pipa is seen travelling with her wondrous family on her back, in all the different stages of maturity. Some of the strange progeny, not yet come to sufficient perfection, appear quite torpid, and as yet without life in the egg; others seem just beginning to rise through the skin; here peeping forth from the shell, and there having entirely forsaken their prison; some are sporting at large upon their parent's back; and others descending to the ground, to try their own fortune below.

THE SALAMANDER.[1]

The ancients have described a lizard that is bred from heat, that lives in the flames, and feeds upon fire, as its proper nourishment. It will be needless to say that there is no such animal existing; and that, above all others, the modern salamander has the smallest affinity to such an animal. The fact is, that, when the animal is exposed to fire, drops of milky fluid ooze through all the pores of the skin. The same circumstance, however, occurs whenever it is handled. This fluid appears to be of an acrid nature.

The salamander[2] best known in Europe, is from eight to eleven inches long; usually black, spotted with yellow; and, when taken in the hand, feeling cold to a great degree. There are several kinds. The black water newt is reckoned among the number. The idle report of its being inconsumable by fire, has caused many of these poor animals to be burnt; but we

[1] The genus *Salamandra* has the body elongated; tail long, cylindrical, or flattened; head depressed; ears concealed, and with a small cartilaginous plate upon the opening; jaws furnished with numerous small teeth, and two longitudinal rows of similar teeth on the palate; tongue short, thick, and fixed in the lower jaw; no third eyelid; feet four, with four toes before and five behind.

[2] *Salamandra terrestris*. Lin.

cannot say as philosophical martyrs; since scarce any philosopher would think it necessary to make the experiment. When thrown into the fire, the animal is seen to burst with the heat of its situation, and to eject its fluids. We are gravely told in the Philosophical Transactions, that this is a method the animal takes to extinguish the flames.

The whole of the lizard kind are so tenacious of life, that they will live several hours after the loss of the head; they also sustain the want of food in a surprising manner. One of them, brought from the Indies, lived nine months without any other food than what it received from licking a piece of earth, on which it was brought over; another was kept by Seba, in an empty phial, for six months, without any nourishment; and Redi talks of a large one, brought from Africa, that lived for eight months, without taking any nourishment whatever. Indeed, as many of this kind, both salamanders and lizards, are torpid, or nearly so, during the winter, the loss of their appetite for so long a time is the less surprising. If wetted with vinegar, however, or sprinkled with powdered salt, the animal soon dies in convulsions.

CLASS FOURTH—FISHES.

Vertebrated animals with cold, red blood, respiring by gills, or bronchiæ, and moving in the water by the aid of fins.

The form of fishes seems as admirably adapted for motion in the water, as that of birds for flight in the air. Suspended in a liquid of nearly the same specific gravity as their own bodies, they do not require extended members for their support. Their general form is elongated, but thicker in the middle than at their extremities; and the tail, the principal instrument in their progressive motion, is always long, and terminated by a vertical fin, capable of expansion and attraction like a fan. The organs of locomotion assume, in this class, the form of fins, of which those named *thoracic* or *pectoral*, from their situation on the body, have been considered as analogous to the fore feet of quadrupeds; and those placed further backwards, called *abdominal* or *ventral fins*, have been conceived to represent the hind feet of the first class of vertebrated animals. The vertical fins on the back are termed *dorsal fins*, and those on the under surface of the body, *anal fins;* the fin by which the tail is terminated, being termed the *caudal fin*. The membranes of these fins are supported by rays or bands, more or less numerous; and those of the pectoral and ventral fins, according to the supposed analogy between the organs of fishes and quadrupeds, have been supposed to represent the toes of the feet. Other rays placed at the extremity of the spinous processes, support the vertical fins of the back, those under the tail, and at its extremity. These *radii*, or rays, are of two kinds; those of a solid, bony, and pointed form, sometimes flexible and elastic, are called *spinous rays;* and those composed of a number of small joints, generally divided into branches at their extremity, are called *soft*, or *articulated rays*. In the number of the members, as many varieties are observed among the fishes as among the reptiles; for, though generally speaking, the fishes have four, yet in some families, there are but two, and others want them altogether.

The greater part of fishes make their progressive motion in the water, by means of their expanded tail, which, striking the water alternately from right to left, impels them forward; and they change their direction by striking more rapidly, or with greater force on one side than on another. The fins, which are in pairs, appear to be intended, besides aiding in progressions, to maintain their equilibrium in the water, and to regulate the direction of their course. Some families, however, as the rays, swim chiefly by means of these fins; but the particular form of the body must naturally influence their medium of locomotion. The greater part of fishes, besides

having their bodies admirably constructed for the liquid in which they move, have in addition a singular apparatus, for rendering them specifically lighter or heavier than water. This consists in a membranous sac, containing air, called the *air-vessel*, or *swimming bladder*, which is placed under the spine, and by compressing or dilating which, they are supposed to rise or sink in the water. This vessel forms two compartments in the carp, and often communicates with the intestines in fishes which inhabit lakes or rivers. One of the chief differences in structure, which characterizes the present class of animals, is their respiratory apparatus. Living in a fluid element, their respiration is necessarily adapted to the nature of that fluid. This is accomplished by means of an apparatus named gills, or bronchiæ placed on the sides of the neck or head. These bronchiæ consist of numerous laminæ, suspended on arches attached to the hyoid bone, each composed of a great number of separate laminæ, covered with a tissue of innumerable blood-vessels. The water which they swallow passes between these laminæ, and escapes by the bronchial openings. In its passage, the blood which is sent from the heart to the gills is acted upon by the air contained in the water. After undergoing this change, it is collected in an arterial trunk under the spine, which, though resembling, in anatomical situation, the aorta of animals with a double heart, performs the functions of a left ventricle, and distributes it by numerous ramifications through the body, from which it returns to the heart by the veins. The bronchial openings are covered either by an osseous moveable plate, which is termed the gill cover, or *operculum*, or, by a simple membrane, with one or more openings.

The whole of blood in fishes is sent by the heart to the bronchial vessels, and is then venous, or dark blood; but when it has been exposed to the air in the water, it assumes the arterial, or red color, and passes into other vessels, which unite in the great arterial trunk under the spine. Thus the heart has but a single auricle, a single ventricle, and a single artery; and it is believed that the little portion of heat developed in this mode of respiration, is owing to the small quantity of air to which the blood is at one time exposed, in passing through the bronchiæ.

The vertebræ of fishes are united together by concave surfaces, filled with cartilage. In the greater number, these vertebræ have long spinous processes, which keep the body in a vertical position. The ribs are often joined to transverse processes. Though the head in fishes varies more in point of form, than in any other class of animals, it always consists of the same number of bones. The frontal bone is composed of six pieces; the parietal, of three; the occipital, of five; the sphenoidal bone of five, and each temporal bone of two pieces. The cranium forms but a small portion of the head. The brain is enveloped by gelatinous matter, and forms many ganglions or consecutive knots, as in the reptiles; and there are ganglions or knots, besides, at the base of the olfactory nerve. A superficial nerve also runs along the body, almost immediately under what is called the *lateral*

line from the head to the tail. Sensation appears to be weak in almost all the class, although some, as the eel, possess irritability after being cut into small portions.

The nostrils in fishes are simple cavities or hollows at the point of the snout, in the interior of which are disposed laminæ in a radiated form. These cavities are often divided into two compartments, and sometimes, as in the lamprey, the two nostrils are united into one. The eye is possessed of a very flat cornea, with but little aqueous humor; but the crystalline lens is almost globular, and very hard. In general, the eyes of fishes are large in proportion to their size, and they are destitute of eyelids. The pupil, or the opening by which light penetrates into the eye, varies much in form. In the greater part of the species of which the eyes are vertical, anatomists remark a singular disposition of the pupillary orifice, which presents the fringes of the iris arranged in such a manner, as to dilate or contract, in order to weaken or augment the quantity of light which enters the eye. In the *Pleuronectes*, both eyes are on the same side of the dorsal line. The ear consists of a sac which represents the vestibule, in which are suspended bones of a stony hardness, and of three semicircular, membranous canals, situate rather in the cavity of the cranium, than in the substance of its walls, except among the *Chondropterygii*. There is neither eustachian tube, nor tympanum, and bones; and the order *Selachii* have only an oval plate, on a level with their head. It is probable that the vibrations of the water may communicate a sensation analogous to that of sound. The sense of *taste* in fishes cannot be delicate, as their tongue is often osseous, and furnished with teeth or other hard covering; they are destitute of salivary glands, and the greater part swallow their food without maceration. Neither is the sense of touch very acute, as in most, the body is covered with scales, and in all, the organs of prehension are wanting. The cirri, or filamentous, fleshy processes of some families, may, perhaps, supply the imperfections of their organs of touch. In the greater number of fishes, the intermaxillary bone forms the margin of the upper jaw, having behind it the maxillary or labial bone. The palatine arch, composed of the palate bones, the two pterygoid processes, the zygomatic process, the tympanum, and the squamous portion, forms, as in birds and serpents, a kind of interior jaw, and furnishes behind, an articulation for the lower jaw, which has two bones on each side; but these pieces are reduced to the smallest number in the Chondropterygii. The teeth of fishes present many varieties. Some have none at all, and in others the jaws are so hard that they form a kind of solid beak; in some, these teeth are pointed, edged, crenated, flat; and in others, they are placed on the lips, the jaws, the palate, the tongue, the gullet, or in all these parts at the same time. The stomach is almost always simple, and the intestinal canal short, as in carnivorous animals; the liver is very large; and there is but one opening for rejected matters, the milt of the male, and the ova of the female.

The sexes in fishes are, in the greater portion, in separate individuals. The ova are generally impregnated by the male after extrusion, and the young are developed without the care of the parent. The male is known, besides other distinctions, by the presence of the testes, or *milt*, and the females by the ovary, or *roe*, which both occupy the same relative place in the body of the animals. Those are said to be viviparous, in which the ova are matured, and the young developed before extrusion. In the developement of the embryo, the heart first appears, afterwards the spine, eyes, and tail. Of the organs of motion, the pectoral fins first appear, followed in succession by the caudal, dorsal, and anal fins. Among the oviparous fishes, hermaphroditism was long considered as a rare and accidental circumstance. Baster noticed this occurrence in the whiting, Duhamel in the carp; Haller gave his testimony to facts of the same nature; and Pallas believed that the genus *Syngnathus* had no males. Lastly, Sir Everard Home, in the Philosophical Transactions for 1815, states the same fact regarding the lampern or pride, and the *Gastrobranchus cæcus* of Bloch.

The amazing reproductive powers of fishes are well known. In the ovary of the cod in December, were formed three millions six hundred and eighty-six thousand seven hundred and sixty ova; in the flounder in March, one million three hundred and fifty-seven thousand and four hundred; in the herring in October, thirty-six thousand nine hundred and sixty; and in the tench, three hundred and eighty-three thousand two hundred and fifty-two. And Bloch relates, as the result of an experiment, regarding the productive power of the carp, that, in a pond of seven acres, in which were placed four males and three females, the increase in one year was one hundred and ten thousand young carp, a number too great for the size of the pond and the necessary supply of food. But this astonishing capability of increase is modified by a thousand circumstances, which regulate the number produced to the supply of food. Myriads of these ova form the food of different species; and myriads more of the young may be supposed to be destroyed in an element where almost all are destined to become the prey of one another. Notwithstanding these deductions, however, the importance of this class as an object of commerce, and as a supply of food, holds out an inexhaustible field for the enterprise of nations whose territories approach the sea. Of the migrations of fishes, and the causes which prompt these annual influxes of certain fishes, on certain coasts, little is with certainty known. Probably they are regulated by the same causes which influence the migrations of birds, to find food and proper places for reproduction; and the same instinctive impulse which induces the salmon, at certain seasons, to ascend rivers, may bring myriads of fishes to the shores for a similar purpose Little is known with regard to the comparative age of fishes. The carp has been known to reach two hundred years, and the pike to two hundred and sixty, and if whales be found of less size now than in former ages, when their

fishery was but little attended to, it may be conjectured, that their age is still more considerable.

SUB-CLASS I.—CARTILAGINOUS FISHES.

The bones of the fishes of this division are essentially cartilaginous, and, in general, are never formed of bony fibres. The most general character common to the cartilaginous fishes, and sufficient to distinguish them from all others, is that of wanting entirely, or having only in a rudimentary form, the maxillary and intermaxillary bones, the place of which is supplied by bones analogous to the palatine ones.

ORDER I.—CYCLOSTOMI.

Fishes of this order have the jaw fixed in an immoveable ring; bronchiæ fixed, and the openings numerous.

THE LAMPREY.[1]

The lamprey much resembles the eel in its general appearance, but is of a lighter color, and rather a clumsier make. It differs, however, in the mouth, which is round, and placed rather obliquely below the end of the nose. It more resembles the mouth of a leech than an eel; and the animal has a hole on the top of the head, through which it spouts water, like the cetacea. There are seven holes on each side for respiration; and the fins are formed rather by a lengthening out of the skin, than any set of bones or spines for that purpose. As the mouth is formed resembling that of a leech, so it has a property resembling that animal, of sticking close to, and sucking any body it is applied to. It is extraordinary, the power they have of adhering to stones; which they do so firmly, as not to be drawn off without some difficulty. We are told of one that weighed but three pounds and yet it stuck so firmly to a stone of twelve pounds, that it remained suspended at its mouth; from which it was separated with no small difficulty. As to the intestines of the lamprey, it seems to have but one great bowel, running from the mouth to the vent, narrow at both ends, and wide in the middle.

[1] The genus *Petromyzon* has the maxillary ring armed with strong teeth; lips formed for suction; tongue with two rows of small teeth; a dorsal fin before, and another behind the anus.

ORDER II.—PLAGIOSTOMI.

Fishes of this order have the bronchiæ pectinated, the openings numerous, without operculi or membranes; palatine and postmandibulary bones armed with teeth in place of jaws.

THE SHARK.

The white shark[1] is sometimes seen to rank even among the whales for magnitude, and is found from twenty to thirty feet long. Some assert that they have seen them of four thousand pounds weight; and we are told particularly of one, that had a human corpse in his belly. The head is large, and somewhat flattened; the snout long, and the eyes large. The mouth is enormously wide, as is the throat, and capable of swallowing a man with great ease. But its furniture of teeth is still more terrible. Of these there are six rows extremely hard, sharp pointed, and of a wedge-like figure. It is asserted that there are seventy-two in each jaw, which make one hundred and forty-four in the whole; yet others think that their number is uncertain; and that, in proportion as the animal grows older, these terrible instruments of destruction are found to increase. With these the jaws both above and below appear planted all over; but the animal has the power of erecting or depressing them at pleasure. When the shark is at rest, they lie quite flat in his mouth; but when he prepares to seize his prey, he erects all his dreadful apparatus, by the help of a set of muscles, that join them to the jaw; and the animal he seizes, dies, pierced with a hundred wounds, in a moment.

Nor is this fish less terrible to behold as to the rest of his form; his fins are larger, in proportion; he is furnished with great goggle eyes, which he turns with ease on every side, so as to see his prey behind him as well as before; and his whole aspect is marked with a character of malignity; his skin also is rough, hard, and prickly; being that substance which covers instrument cases, called shagreen.

No fish can swim so fast as the shark; he outstrips the swiftest ships. Such amazing powers, with such great appetites for destruction, would quickly unpeople even the ocean; but providentially the shark's upper jaw projects so far above the lower, that he is obliged to turn on one side (not on his back, as is generally supposed,) to seize his prey. As this takes some small time to perform, the animal pursued seizes that opportunity to make his escape.

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[1] *Carcharias vulgaris*, Cuv. The genus *Carcharias* has the snout prominent, conical and depressed; nostrils under its middle; teeth in many rows, edged, pointed, and often dentated on their margin; no spiracles; first dorsal fin before the ventrals, and the second nearly opposite the anal fin; last openings of the bronchiæ extending over the pectoral fins.

Still, however, the depredations he commits are frequent and formidable. The shark is the dread of sailors in all hot climates, where, like a greedy robber, he attends the ships, in expectation of what may drop overboard. A man who unfortunately falls into the sea at such a time is sure to perish.

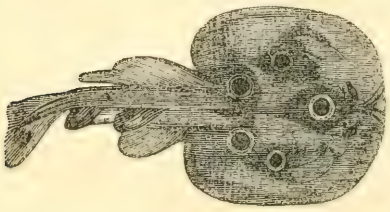
The usual method by which sailors take the shark, is by baiting a great hook with a piece of beef or pork, which is thrown out into the sea, by a strong cord, strengthened near the hook with an iron chain. Without this precaution, the shark would quickly bite the cord in two, and thus set himself free. It is no unpleasant amusement to observe this voracious animal coming up to survey the bait, particularly when not pressed by hunger. He approaches it, examines it, swims round it, seems for a while to neglect it, perhaps apprehensive of the cord and chain; he quits it for a little; but, his appetite pressing, he returns again; appears preparing to devour it, but quits it once more. When the sailors have sufficiently diverted themselves with his different evolutions, they then make a pretence, by drawing the rope, as if intending to take the bait away; it is then that the glutton's hunger excites him; he darts at the bait, and swallows it, hook and all. Sometimes, however, he does not so entirely gorge the whole, but that he once more gets free; yet even then, though wounded and bleeding with the hook, he will again pursue the bait until he is taken. When he finds the hook lodged in his maw, his utmost efforts are then excited, but in vain, to get free; he tries with his teeth to cut the chain; he pulls with all his force to break the line; he almost seems to turn his stomach inside out, to disgorge the hook; in this manner he continues his formidable though fruitless efforts; till, quite spent, he suffers his head to be drawn above water, and the sailors, confining his tail by a noose, in this manner draw him on ship-board, and despatch him. This is done by beating him on the head till he dies; yet even that is not effected without difficulty and danger; the enormous creature, terrible even in the agonies of death, still struggles with his destroyers; nor is there an animal in the world that is harder to be killed. Even when cut in pieces, the muscles still preserve their motion, and vibrate for some minutes after being separated from the body. Another method of taking him, is by striking a barbed instrument, called a fizgig, into his body, as he brushes along by the side of the ship. As soon as he is taken up, to prevent his flouncing, they cut off the tail with an axe, with the utmost expedition.

This is the manner in which Europeans destroy the shark; but some of the negroes along the African coast take a bolder and more dangerous method to combat their terrible enemy. Armed with nothing more than a knife, the negro plunges into the water, where he sees the shark watching for his prey, and boldly swims forward to meet him. Though the great animal does not come to provoke the combat, he does not avoid it, and suffers the man to approach him; but, just as he turns upon his side to seize the aggressor, the negro watches the opportunity, plunges his knife

into the fish's belly, and pursues his blows with such success, that he leaves the ravenous tyrant dead at the bottom; he soon however returns, fixes the fish's head in a noose, and drags him to shore, where he makes a noble feast for the adjacent villages.

Besides the above, there are also the *blue shark*,[1] *long-tailed shark*, *basking shark*,[2] *hammer-headed shark*,[3] *angel shark*,[4] *fox shark*,[5] *porbeagle shark*,[6] and others.

THE TORPEDO.[7]



The body of this fish is almost circular, and thicker than others of the same genus; the skin is soft, smooth, and of a dusky brown above, and white underneath; the eyes very small; the tail tapering to a point; and the weight of the fish from a quarter to fifteen pounds. Redi found one twenty-four pounds weight. The electrical rays are found in many parts of the European seas. The fishermen often discover it in Torbay, and sometimes of eighty pounds weight. They are partial to sandy bottoms, in about forty fathoms water, where they often bury themselves by flinging the sand over them, by a quick flapping of all the extremities. They bring forth their young in autumn. To all outward appearance, the torpedo is furnished with no extraordinary qualities; yet such is the unaccountable power it possesses, that, the instant it is touched, it numbs not only the hand and arm, but sometimes also the whole body. The shock received resembles the stroke of an electrical machine; sudden, tingling, and painful. It is, in truth, electric. "The instant," says Kempfer, "I touched it with my hand, I felt a terrible numbness in my arm, and as far up as the shoulder.

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[1] *Carcharias glaucus*, Cuv.

[2] *Selache maximus*, Cuv.

[3] *Zygæna vulgaris*, Cuv.

[4] *Squatina lævis*, Cuv.

[5] *Carcharias vulpes*, Cuv.

[6] *Samna cornubiensis*, Cuv.

[7] The characteristics of the genus *Torpedo* are a body smooth, depressed, obtuse before, and nearly circular; anterior border formed by productions of the snout, which extend along the sides to meet the pectoral fins; five bronchial openings on each side, beneath electrical organs on the sides; teeth small, and pointed; tail short, and fleshy.

Even if one treads upon it with the shoe on, it affects not only the leg, but the whole thigh upwards. Those who touch it with the foot, are seized with a stronger palpitation than even those who touch it with the hand. This numbness bears no resemblance to that which we feel when a nerve is a long time pressed and the foot is said to be asleep; it rather appears like a sudden vapor, which, passing through the pores, in an instant penetrates to the very springs of life, whence it diffuses itself over the whole body, and gives real pain. The nerves are so affected, that the person struck imagines all the bones of his body, and particularly those of the limb that received the blow, are driven out of joint. All this is accompanied with a universal tremor, a sickness of the stomach, a general convulsion, and a total suspension of the faculties of the mind."

Reaumur, who made several trials upon this animal, has convinced the world that it is not necessarily, but by an effort, that the torpedo numbs the hand of him that touches it. He tried several times, and could easily tell when the fish intended the stroke, and when it was about to continue harmless. Always before the fish intended the stroke, it flattened the back, raised the head and the tail, and then, by a violent contraction in the opposite direction, struck with its back against the pressing finger; and the body, which before was flat, became humped and round.

The electric or benumbing organs are placed one on each side of the gills, reaching from thence to the semicircular cartilages of each great fin, and extending longitudinally from the interior extremity of the animal to the transverse cartilage which divides the thorax from the abdomen, and within these limits they occupy the whole space between the skin of the upper and under surfaces. Each organ is about five inches in length, and at the anterior end, about three in breadth; they are composed of perpendicular columns, reaching from the upper to the under surface, varying in length according to the thickness of the parts of the body, from an inch and a half, to half an inch. The engraving displays the interior of the lower electric or galvanic organ.

When the fish is dead, the whole power is destroyed, and it may be handled or eaten with perfect security.

THE RAY.[1]

Of this fish there are several species; as, the thornback, starry, sharp-nosed, rough, small-eyed, and undulated rays.

[1] The genus *Raia* has a rhomboidal disc; five bronchial openings on each side beneath; mouth below; tail slender, with two small dorsal fins near its extremity; teeth small, crowded, and in quincunx order; males with hooked spines on the pectorals.

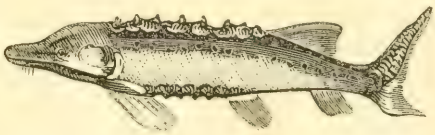
THE SKATE[1]

Is the largest of the genus, as well as the best; the flesh being white, firm, and of a good flavor. It is sometimes of an immense size. It has a broad flat body, brown on the back, and white on the belly. The principal difference between it and the thornback consists in its having sharp teeth, and a single row of spines on the tail; whilst the latter has blunt teeth, and several rows of spines both on the back and tail. The females produce their offspring from May till September. Each of the young ones is inclosed in an angular oblong bag, of a maroon color; a substance like thin parchment, or leather, and having two horns at each end. These, which are sometimes cast ashore after storms, are called purses by the fishermen.

ORDER III.—STURIONES.

These fishes have bronchial openings, much cleft, furnished with an operculum, but without rays in the membrane; bronchiæ free.

THE STURGEON,[2]



In its general form, resembles a fresh water pike. Formidable as this large and finely tasted fish is in its appearance, it is perfectly harmless; the body, which is from six to eighteen feet in length, is pentagonal, armed from head

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[1] *Raia batis*, Lin.

[2] *Accipenser sturio*, Lin. The genus *Accipenser* has the body elongated, and furnished, as well as the head, with rows of bony prominences; mouth placed under the snout cylindrical, retractile, and without teeth; four cirri beneath the snout.

to tail with five rows of large bony tubercles, each of which ends in a strong recurved tip; one of these is on the back, one on each side, and two on the margin of the belly. The snout is long, and obtuse at the end, and has the tendrils near the tip. The mouth, which is beneath the head, is somewhat like the opening of a purse, and is so formed as to be pushed suddenly out or retracted. The upper part of the body is of a dirty olive color; the lower parts silvery; and the tubercles are white in the middle. The tendrils on the snout, which are some inches in length, have so great a resemblance in form, to earth-worms, that, at first sight, they might be mistaken for them. By this contrivance, this clumsy, toothless fish is supposed to keep himself in good condition, the solidity of his flesh evidently showing him to be a fish of prey. He is said to hide his body among the weeds near the sea coast, or at the mouths of large rivers, only exposing his tendrils, which small fishes or sea insects, mistaking for real worms, approach to seize, and are sucked into the jaws of their enemy. He has been supposed by some to root into the soil at the bottom of the sea or rivers; but, if this were the case, the tendrils above-mentioned, which hang from his snout over his mouth, must be very inconvenient to him. As he has no jaws, it is evident that he lives by suction, and, during his residence in the sea, marine insects are generally found in his stomach.

A very great trade is carried on with the roe of the sturgeon, preserved in a particular manner, and called caviar; it is made from the roe of all kinds of sturgeon. This is much more in request in other countries of Europe than in England. To all these high-relished meats, the appetite must be formed by degrees; and though formerly, even in England, it was very much in request at the politest tables, it is at present sunk entirely into disuse. It is still, however, a considerable merchandise among the Turks, Greeks, and Venetians. Caviar somewhat resembles soft soap in consistence; but it is of a brown, uniform color, and is eaten as cheese with bread.

THE HUSO, OR ISINGLASS FISH,[1]

Is caught in great quantities in the Danube, from the months of October to January; it is seldom under fifty pounds weight, and often above four hundred; its flesh is soft, glutinous, and flabby; but it is sometimes salted, which makes it better tasted, and then it turns red like a salmon. It is for the commodity it furnishes that it is chiefly taken. The manner of making it is this: they take the skin, the entrails, the fins, and the tail of this fish, and cut them into small pieces; these are left to macerate in a sufficient

[1] *Accipenser huso*, LIN.

quantity of warm water, and they are all boiled shortly after with a slow fire, until they are dissolved and reduced to a jelly; this jelly is spread upon instruments made for the purpose, so that in drying, it assumes the form of parchment, and, when quite dry, it is then rolled into the form which we see it in the shops. This valuable commodity is principally furnished from Russia.

SUB-CLASS II.—OSSEOUS FISHES.

This division includes the fishes with free bronchiæ, and of which the bones, though varying in hardness, are always fibrous. The cranium is divided by sutures.

ORDER IV.—PLECTOGNATHI.

These fishes have the upper jaw formed by the intermaxillary bone, which is immoveably fixed upon the side of the maxillary; palatine arch fixed to the cranium; bronchial cleft simple.

ORDER V.—LOPHOBRONCHII.

These fishes have the jaws complete; bronchiæ in the form of small, round tufts, disposed in pairs along the bronchial arteries.

THE SEA HORSE[1]

Is a small fish of a curious shape. The length seldom reaches twelve inches; the head bears some resemblance to that of a horse, whence originates its name. A long back fin runs from the head to the tail, which is spirally covered. The eggs of this fish are hatched in a pouch, formed by an expansion of the skin, which in some is placed under the belly, and in others at the base of the tail, and which opens to allow the young to get out.

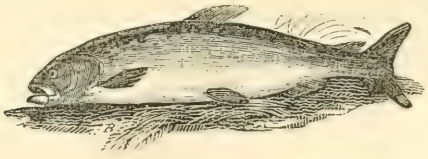
This fish is often seen in cabinets and museums in a dried state.

[1] *Hippocampus vulgaris*, Lin. The genus *Hippocampus* has the snout tubular; trunk of the body compressed laterally, and more elevated than the tail; joinings of the scales raised into ridges, and the projecting angles spinous; no ventral fins; bronchial openings on the neck.

ORDER VI.—MALACOPTERYGII ABDOMINALES.

These fishes have the skeleton osseous; jaws complete; bronchiæ pectinated; all the rays of the fins soft, except sometimes the first ray of the dorsal, or pectoral fins; ventral fins behind the abdomen.

THE SALMON[1]



Is distinguished from other fish by having two dorsal fins, of which the hindermost is fleshy and without rays; they have teeth both in the jaws and the tongue, and the body is covered with round and minutely striated scales. Gray is the color of the back and sides, sometimes spotted with black, and sometimes plain. The belly is silvery. It is entirely a northern fish, being found both at Greenland, Kamtschatka, and the northern parts of North America, but never so far south as the Mediterranean. Salmon are now scarce in all our rivers south of the Merrimac. In the Connecticut they were once so abundant as to be less esteemed than shad, and the fishermen used to require their purchasers to take some salmon with their shad. Within the memory of persons living, they were taken in plenty even as far up as Vermont. The Indians used to catch a great many of them, as they were ascending Bellows Falls. It is supposed that the locks, dams, and canals constructed in the river, have driven this valuable fish away. About the latter end of the year, the salmon begin to press up the rivers, even for hundreds of miles, to deposit their spawn, which lies buried in the sand till spring, if not disturbed by the floods, or devoured by other fishes. In this peregrination it is not to be stopped, even by cataracts. About March, the young ones begin to appear, and about the beginning of May, the river is full of the salmon fry, which are then four or five inches long, and gradually proceed to the sea. About the middle of June, the earliest fry begin to return again from the sea, and are then from twelve to fourteen inches long. The growth of this fish is so extraordinary, that a young salmon being taken at Warrington, and which weighed seven pounds on the seventh of Februa-

[2] *Salmo salar*, Lin. The genus *Salmo* has the greater part of the upper jaw formed by the maxillary bones; mouth large and furnished with teeth; ventral fins opposite the middle of the first dorsal, and the adipose fin opposite the anal; bronchial membrane with more than eight rays.

ry, being marked with a scissors on the back fin, was again taken on the seventeenth of March following, and was then found to weigh seventeen pounds and a half.

THE SEA-TROUT, OR SALMON-TROUT,[1]

Migrates like the salmon up several of our rivers, spawns, and returns to the sea. The shape is thicker than the common trout. The head and back are dusky, with a gloss of blue and green, and the sides, as far as the lateral line, are marked with large irregular spots of black. The flesh, when boiled, is red, and resembles that of a salmon in taste.

THE TROUT.[2]

This is a fish of prey, has a short, roundish head, blunt nose, and wide mouth, filled with teeth, not only in the jaws, but on the palate and tongue; the scales are small, the back ash color, the sides yellow, and, when in season, it is sprinkled all over the body and covers of the gills with small beautiful red and black spots; the tail is broad.

The colors of the trout, and its spots, vary greatly in different waters, and in different seasons; yet each may be reduced to one species. In Llyndivi, a lake in South Wales, are trouts called cochy-dail, marked with red and black spots as big as sixpences; others unspotted, and of a reddish hue, that sometimes weigh near ten pounds, but are bad tasted.

In Lough Neagh, in Ireland, trouts are called buddaghs, which sometimes weigh thirty pounds.

Trouts are common in all the mountainous parts of the United States east of the Alleghany ridge.

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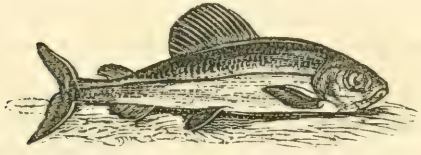
[1] *Salmo trutta*, Lin. [2] *Salmo fario*, Lin.

THE SMELT[1]

Inhabits the northern seas, and is never found so far south as the Mediterranean. Its name is supposed to be a contraction of "smell it," from its very agreeable smell. The Germans, however, call it the stink-fish. Its form is very elegant; it is of a silvery color, tinged with yellow; and the skin is almost transparent. The largest we have heard of was thirteen inches long, and weighed half a pound.

THE GRAYLING[2]



Is in general of a fine silvery gray, but when just taken it is varied slightly with blue and gold. The scales are large; the first dorsal fin consists of twenty-one rays; this fin is spotted; all the rest are plain; the tail is much forked. It haunts clear and rapid streams, particularly those of mountainous countries. In Lapland, where it is very common, the inhabitants use its entrails, instead of rennet, to make their cheese from the milk of the rein-deer. The stomach is so hard and thick, that to the touch it appears like cartilage. The largest that has been heard of was taken near Ludlow; it was half a yard long, and weighed four pounds six ounces. The ancients believed that the oil from them would obliterate freckles and small pox marks.

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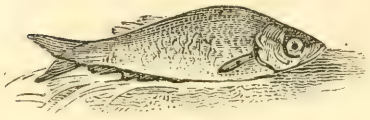
[1] *Osmerus eperlanus*, Cuv. The characteristics of this genus are the mouth at the extremity of the snout; head compressed; scales scarcely visible; two dorsal fins; two rows of scattered teeth on each palatine bone; bronchial membrane with eight rays.

[2] *Coregonus thymallus*, Cuv. This genus has the mouth at the extremity of the snout very little cleft; head compressed; scales large; two dorsal fins, of which the second is adipose, and without rays; bronchial membrane with seven or eight rays; teeth small.

THE HERRING.[1]



The common herring is distinguished from the other fish of the same tribe, by the projection of the lower jaw, which is curved, and by having seventeen rays in the ventral fin. The head and mouth are small, the tongue short, pointed, and armed with teeth, the covers of the gills generally have a violet or red spot, that disappears soon after the death of the fish, which survives a very short time, when taken out of its natural element.

Of all the migrating fish, the herring and the pilchard take the most adventurous voyages. Herrings are found in the greatest abundance in the highest northern latitudes. In those inaccessible seas, that are covered with ice for a great part of the year, the herring and pilchard find a quiet and sure retreat from all their numerous enemies; thither neither man, nor their still more destructive enemy, the fin-fish, or the cachalot, dares to pursue them. The quantity of insect food which those seas supply is very great; whence, in that remote situation, defended by the icy rigor of the climate, they live at ease, and multiply beyond expression. From this most desirable retreat, Anderson supposes they would never depart, but that their numbers render it necessary for them to migrate; and, as bees from a hive, they are compelled to seek for other retreats.

For this reason, the great colony is seen to set out from the icy sea about the middle of winter; composed of such numbers, that if all the men in the world were to be loaded with herrings, they would not carry the thousandth part away. But they no sooner leave their retreats, but millions of enemies appear to thin their squadrons. The fin-fish and the cachalot swallow barrels at a yawn; the porpus, the grampus, the shark, and the whole numerous tribe of dog-fish, find them an easy prey, and desist from making war upon each other; but still more, the unnumbered flocks of sea-fowl that chiefly inhabit near the pole, watch the outset of their dangerous migration. and spread extensive ruin.

In this exigence, the defenceless emigrants find no other safety, but by crowding closer together, and leaving to the outmost bands the danger of being the first devoured; thus, like sheep when frightened, that always run together in a body, and each finding some protection in being but one of

[1] *Clupea harengus*, Lin. The genus *Clupea* has the intermaxillary bones narrow, arched before, and divided longitudinally into many pieces; mouth not entirely furnished with teeth, and often edentate; belly compressed, carinated, the scales forming a serraturo on the ridge; one dorsal fin, above the ventral ones.

many that are equally liable to invasion, they are seen to separate into shoals, one body of which moves to the west, and pours down along the coast of America, as far south as Carolina, and but seldom farther. In Chesapeake Bay, the annual inundation of these fish is so great, that they cover the shores in such quantities as to become a nuisance. Those that hold more to the east, and come down towards Europe, endeavor to save themselves from their merciless pursuers, by approaching the first shore they can find; and that which first offers in their descent is the coast of Iceland, in the beginning of March. Upon their arrival on that coast, their phalanx, which has already suffered considerable diminutions, is, nevertheless, of amazing extent, depth, and closeness, covering an extent of shore as large as the island itself. The whole water seems alive; and is seen so black with them at a great distance, that the number seems inexhaustible.

That body which comes upon the English coast, begins to appear off the Shetland Isles, in April. These are the forerunners of the grand shoal which descends in June; while its arrival is easily announced, by the number of its greedy attendants, the gannet, the gull, the shark, and the porpus. When the main body is arrived, its breadth and depth is such, as to alter the very appearance of the ocean. It is divided into distinct columns, of five or six miles in length, and three or four broad; while the water before them curls up, as if forced out of its bed. Sometimes they sink for the space of ten or fifteen minutes, then rise again to the surface; and, in bright weather, reflect a variety of splendid colors, like a field bespangled with purple, gold, and azure. The fishermen are ready prepared to give them a proper reception; and, by nets made for the occasion, they take sometimes above two thousand barrels at a single draught.

Such has long been the received opinion with respect to the migration of herrings, and it is so poetical that it is almost a pity to disturb it. But science must listen only to the voice of truth. The author of the British Naturalist has given a rude shock to the migratory theory. "Simply, then, the story cannot be true, (says he,) because it is impossible. The herrings do not come in myriads from the polar sea, beginning their progress in January, because there are no means of producing them there. Spawn has not been found to animate in any place except floating near the surface, or in shallow water, where both the sun and the air act upon it; and while the polar seas and shores are open to such action, the herrings are not there, they are on our shores, the full grown and the young. But setting aside the impossibility, the supposed emigration would be without an object; they would not come for food, as they are said to leave the north just when food would be found there; and if they are annually produced in the north, they could not come to our shores for the purpose of spawning, even though they are all obviously in preparation for such a purpose. Beside, there is no animal that migrates southward in the spring; and therefore the theory would require one law for the rest of creation, and another for the herring;

that the latter should be chilled by the genial warmth of the spring, and warmed by the polar frost. Now, so far is the production of fish from being independent of the influence of heat, that, just as one would be led to infer from the slow progress of the solar beams through the element in which they live, they require the whole, or the greater part of our summer, to mature the germs of their countless broods. Nay, it appears that many, if not most of the species, cannot mature their spawn in the depths of the ocean, to which they retire to recruit their strength, but that they come to the shores and shallows, where the heat of the sun can penetrate to the bottom, and be reflected by it, for the purpose of maturing, as well as depositing, their spawn.

"The herrings come to the shores and estuaries to mature and propagate their spawn, which they do over a greater range of the year than most other fish; continuing the operation to the middle of winter, and retiring into deeper water after that is done. But there is no reason to conclude, that they have much migration in latitude; or, that they ever move far from those shores which they frequent in the season. The fry too are found on the shores and in the bays and estuaries frequented by their parents; and they do not go to the deep water till late in the season. They even appear to go farther up the rivers than the old fish, for they may be taken in brackish water, with a common trout fly."

THE SHAD[1]

Is taken in many rivers; those of the Severn are most esteemed in England, and are distinguished by the London fishmongers by the French name of *alosse*. The Thames shad is a very insipid, coarse fish. The Thames shad, when it visits the Severn, is called the *twaite*, and is held in great disrepute.

The difference between the two kinds is as follows:—The true *shad* weighs from four to eight pounds; the *twaite* from half a pound to two. The twaite may also be known from a small shad, by having one or more black spots on the sides; when it has only one, it is always near the gill.

The shad of America is a very superior fish, and is abundant in all the northern rivers. Those of the Connecticut are particularly esteemed, and, when salted and barrelled, command a high price. These fish are chiefly taken during the months of April and May. They ascend the rivers for many miles, and formerly large numbers of them were caught in the Connecticut, at the distance of two hundred miles from its mouth.

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[1] *Clupea alosa*, Lin.

THE ANCHOVY[1]

Is about six inches and a half in length. The body is slender, but thicker in proportion than the herring. The scales are large, and easily fall off. The back is green, and semipellucid; the sides and belly silvery; and the tail forked.

At different seasons it frequents the Atlantic ocean and the Mediterranean sea, passing through the Straits of Gibraltar towards the Levant in the months of May, June, and July. The greatest fishery is at Gorgona, a small isle west of Leghorn, where they are taken at night in nets, into which they are allured by lights fixed to the stern of the vessels. When cured, their heads are cut off, their gall and entrails taken out, then salted and packed in barrels. It scarce needs to be mentioned that, being put on the fire, they dissolve in almost any liquor. They are well tasted when fresh. But it has been found by experience, that anchovies taken thus by torch light are neither so good, so firm, nor so proper for keeping, as those which are taken otherwise. From December to March, vast numbers are caught on the shores of Provence and Catalonia, and during June and July in the English channel, and in the environs of Bayonne, Venice, Rome, and Genoa. From the anchovy the ancients prepared one of the liquids called *garum*, which was in high repute among epicures.

THE PIKE[2]

Is common in most of the lakes of Europe, but the largest are those taken in Lapland, which, according to Schæffer, are sometimes eight feet long. They are taken there in great abundance, dried and exported for sale. The largest fish of this kind which we have ever heard of in England, weighed thirty-five pounds.

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[1] *Engraulis encrasicolus*, Cuv. The genus *Engraulis* has the ethmoid and nasal bones forming a projecting point, below which the very small intermaxillaries are fixed; maxillary bones straight and very long; jaws much cleft, and both furnished with teeth; bronchial openings large.

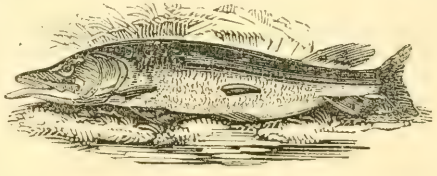
[2] *Esox lucius*, Lin. The genus *Esox* has the snout long, obtuse, broad, and depressed; long-pointed teeth on the sides of the lower jaw; the intermaxillaries, vomer, palate and tongue furnished with small and crowded teeth; one dorsal fin opposite the anal one.

According to the common saying, these fish were introduced into England in the reign of Henry the Eighth, in 1537. They were so rare, that a pike was sold for double the price of a house-lamb, in February, and a pickerel for more than a fat capon.

All writers who treat of this species bring instances of its vast voraciousness. We have known one that was choked by attempting to swallow one of its own species that proved too large a morsel. Yet its jaws are very loosely connected; and have on each side an additional bone like the jaw of a viper, which renders them capable of great distention when it swallows its prey. It does not confine itself to feed on fish and frogs; it will devour the water-rat, and draw down the young ducks as they are swimming about.

At the marquis of Stafford's canal at Trentham, England, a pike seized the head of a swan, as she was feeding under water, and gorged so much of it as killed them both. The servants perceiving the swan with its head under water for a longer time than usual, took the boat, and found both swan and pike dead.

But there are instances of its fierceness still more surprising, and which, indeed, border a little on the marvellous. Gesner relates, that a famished

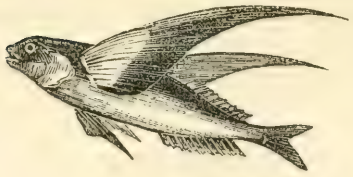


pike in the Rhone seized on the lips of a mule, that was brought to water and that the beast drew the fish out before it could disengage itself; that people have been bit by these voracious creatures while they were washing their legs; and that they will even contend with the otter for its prey, and endeavour to force it out of its mouth.

Pike spawn in March or April, according to the coldness or warmth of the weather. When they are in high season, their colors are very fine, being green, spotted with bright yellow; and the gills are of a most vivid and full red. When out of season, the green changes to gray, and the yellow spots turn pale.

The head is very flat; the upper jaw broad, and is shorter than the lower; the under jaw turns up a little at the end, and is marked with minute punctures. The teeth are very sharp, disposed not only in the front of the upper jaw, but in both sides of the lower, in the roof of the mouth, and often the tongue. The slit of the mouth, or the gape, is wide; the eyes small. The dorsal fin is placed very low on the back, and consists of twenty-one rays; the pectoral, of fifteen; the ventral, of eleven; the anal of eighteen. The tail is bifurcated.

THE FLYING-FISH[1]

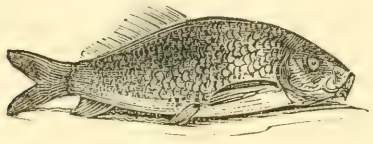


THE body of this fish is oblong; the head is almost three cornered; the fin covering the gills with ten rays; the pectoral fin placed high, and as long as the whole body; the back fin at the extremity of the back. The tail is bifurcated. As it is a small animal, seldom growing above the size of a herring, it is chiefly sought by the dorado. Nature has furnished each respectively with the powers of pursuit and evasion. The dorado being above six feet long, yet not thicker than a salmon, and furnished with a full complement of fins, cuts its way through the water, with amazing rapidity; on the other hand, the flying-fish is furnished with two pair of fins, longer than the body, and these also moved by a stronger set of muscles than any other. This equality of power seems to furnish one of the most entertaining spectacles those seas can exhibit. The efforts to seize on the one side, and the arts of escaping on the other, are perfectly amusing. The dorado is seen, upon this occasion, darting after its prey, which will not leave the water, while it has the advantage of swimming, in the beginning of the chase. But, like a hunted hare, being tired at last, it then has recourse to another expedient for safety, by flight. The long fins, which began to grow useless in the water, are now exerted in a different manner and different direction to that in which they were employed in swimming; by this means the timid little animal rises from the water, and flutters over its surface, for two or three hundred yards, till the muscles employed in moving the wings, are enfeebled by that particular manner of exertion. By this time, however, they have acquired a fresh power of renewing their efforts in the water, and the animal is capable of proceeding with some velocity by swimming; still, however the active enemy keeps it in view, and drives it again from the deep; till at length, the poor little creature is seen to dart to shorter distances, to flutter with greater effort, and to drop down at last into the mouth of its fierce pursuer. But not the dorado alone—all animated nature seems combined against this little fish, which seems possessed of double powers, only to be subject to greater dangers; for, though it should escape from its

[1] *Exocetus evolans*, BLOCH. The genus *Exocetus* has the head covered with scales; ten rays in the bronchial membrane; eyes large; jaws furnished with small pointed teeth and the pharyngeal bones with flat ones; pectoral fins as long as the body.

enemies of the deep, yet the tropic bird and the albatross are forever upon the wing to seize it. Thus pursued in either element, it sometimes seeks refuge with a new enemy; and it is not unfrequent for whole shoals of them to fall on shipboard, where they furnish man with an object of useless curiosity.

THE CARP.[1]



Polish Prussia is the chief seat of the carp; they abound in the rivers and lakes of that country, particularly in the Frisch and Curischhaff, where tney are taken of a vast size. They are there a great article of commerce, and sent in well boats to Sweden and Russia. The merchants purchase them out of the waters of the noblesse of the country, who draw a good revenue from this article. Neither are there wanting, among the English gentry, instances of some who make good profits of their ponds.

The carp is a prodigious breeder; its quantity of roe has been found so great that, when taken out and weighed against the fish itself, the former has been found to preponderate. From the spawn of this fish caviar is made for the Jews, who hold the sturgeon in abhorrence.

These fish are extremely cunning, and on that account are by some styled the *river fox*. They will sometimes leap over the nets, and escape that way; at others, will immerse themselves so deep in the mud, as to let the net pass over them. They are also very shy of taking a bait; yet at the spawning time they are so simple as to suffer themselves to be tickled and caught by any body that will attempt it. It is so tenacious of life that it may be kept alive for a fortnight in wet straw or moss.

This fish is apt to mix its milt with the roe of other fish, from which is produced a spurious breed; we have seen the offspring of the carp and tench, which bore the greatest resemblance to the first; we have also heard of the same mixture between the carp and bream.

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[1] *Cyprinus carpio*, Lin. The genus *Cyprinus* has three flat rays in the bronchial membrane; tongue and palate smooth; dorsal fin long; second ray of the dorsal and anal fin spinous and dentated.

THE GOLDEN CARP.[1]

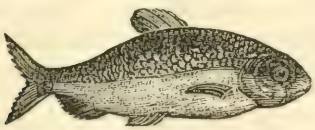
This is the common gold fish, which are now domesticated in our houses and fish ponds. They were originally brought from Southern China, and were not generally known in England or America, before the early part of the last century.

In China, the most beautiful kinds are taken in a small lake in the province of Che-Kyang. Every person of fashion keeps them for amusement, either in porcelain vessels, or in the small basons that decorate the courts of the Chinese houses. The beauty of their colors, and their lively motions, give great entertainment, especially to the ladies, whose pleasures, by reason of the cruel policy of that country, are extremely limited.

In the form of the body, they bear a great resemblance to a carp. They have been known in Europe to arrive at the length of eight inches; in their native place, they are said to grow to the size of our largest herring.

The nostrils are tubular, and form a sort of appendages above the nose; the dorsal fin and the tail vary greatly in shape; the tail is naturally bifid, but in many it is trifid, and in some even quadrifid; the anal fins are the strongest characters of this species, being placed not behind one another, like those of other fish, but opposite each other, like the ventral fins.

THE ROACH.[2]



'Sound as a roach,' is a proverb that appears to be but indifferently founded, that fish being not more distinguished for its vivacity than many others; yet it is used by the French as well as the English, who compare people of

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[1] *Cyprinus auratus*, Lin.

[2] *Leuciscus rutilus*, Cuv. The genus *Leuciscus* has the dorsal and anal fins short, and destitute of spines and cirrhi.

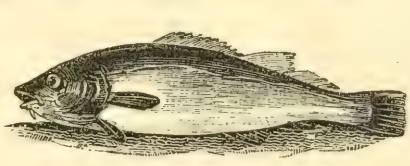
strong health to the *rouget*, or roach. It is so silly a fish, that it is called the water sheep.

It is a common fish, found in many of our deep still rivers, affecting, like the others of this genus, quiet waters. It is gregarious, keeping in large shoals. We have never seen them very large. Old Walton speaks of some that weighed two pounds. In a list of fish sold in the London markets, with the greatest weight of each, there is mention of one whose weight was five pounds.

ORDER VII.—MALACOPTERYGII SUBRACHIATI.

These fishes have the jaws complete; bronchiæ pectinated; ventral fins placed either before the pectorals, between them, or a little behind.

THE COD.[1]



The cod seems to be the foremost of the wandering tribe of fishes, and is only found in the northern part of the world. Their principal food consists of the smaller species of fish, worms, shell-fish, and crabs; and their stomachs are capable of dissolving the major part of the shells which they swallow. They grow to a great size. The largest that ever was seen, was taken at Scarborough, England, in 1775. It weighed seventy-eight pounds, and was five feet eight inches long. This animal's chief place of resort is on the banks of Newfoundland, and the other sand banks that lie off Cape Breton. That extensive flat seems to be no other than the broad top of a sea mountain, extending for above five hundred miles long, and surrounded with a deeper sea. Hither the cod annually repair, in numbers beyond the power of calculation, to feed on the quantity of worms that are to be found there in the sandy bottom. Here they are taken in such quantities, that they supply Europe and America with a considerable share of provision. The English have stages erected all along the shore, for salting and drying them; and the fishermen, who take them with the hook and line, which is their method, draw them in as fast as they can throw out. An expert hand will sometimes capture four hundred in a day. This

[1] *Morrhua vulgaris*, Lin. The genus *Morrhua* has the head compressed; eyes distant, on the sides of the head; body elongated, slightly compressed; three dorsal fins; two anal; ventral fins pointed; a cirrus at the point of the lower jaw.

immense capture, however, makes but a very small diminution, when compared to their numbers; and when their provision there is exhausted, or the season for propagation returns, they go off to the polar seas, where they deposit their spawn. Previous to the discovery of Newfoundland, the principal fisheries for cod were in the Iceland seas, and off the western isles of Scotland.

THE HADDOCK[1]

Is a well-known fish of this genus, which much resembles the cod, but is smaller; it is also distinguished by a black mark on each side beyond the gills, which superstition ascribes to the impression which St Peter left with his finger and thumb, when he took the tribute money out of the fish's mouth, which tradition would have us believe to have been of this species.

THE HALIBUT[2]

Weighs from one hundred to three hundred pounds. The halibut is the most voracious of fishes, and has been known to swallow even the lead which seamen make use of for the purpose of sounding the depth. Its back is a dusky color; its belly pure white. The flesh is very coarse and indifferent food. It is the narrowest fish in proportion to its length of any of this genus, except the sole.

THE TURBOT,[3]

Like some others of the flat fish, grows to a great size. It has occasionally been known to weigh from twenty-five to thirty pounds. In its general form it is somewhat square. Flat fish swim sideways, on which account they are styled *pleuronectes* by Linnæus. The eyes of all of them are situated on one side of the head, those of the turbot on the left; and it is a curious circumstance, that, while the under parts of their body are of a brilliant white, the upper parts are so colored and speckled, as, when they are half

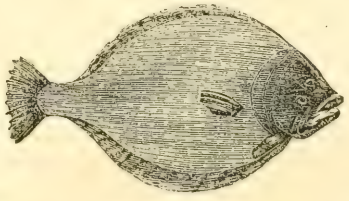
[1] *Morrhua æglefinus*, Lin.

[2] *Hippoglossus vulgaris*, Bloch. This genus has the body oblong, compressed; the jaws and pharynx armed with slender pointed teeth; an interval between the dorsal and anal fins and tail.

[3] *Rhombus maximus*, Cuv. This genus has the jaws and pharynx with numerous slender pointed teeth; dorsal fin rising from the margin of the upper jaw, and running, as well as the anal, almost to the tail; eyes in the greater number sinistral.

immersed in the sand or mud, to render them imperceptible. Of this resemblance they are so conscious, that, whenever they find themselves in danger, they sink into the mud, and continue perfectly motionless. This is a circumstance so well known to fishermen, that within their palings on the strand, they are often under the necessity of tracing furrows with a kind of iron sickle, to detect by the touch what they are not otherwise able to distinguish. But the turbot does not thus hide itself for security alone. It resorts to this stratagem as an ambush for obtaining its prey, whence it pounces forth on the smaller kinds of fish that incautiously approach it.

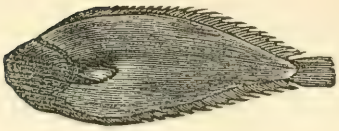
The finest turbot in the world are found off the northern shore of England, and some parts of the Dutch coast. The manner of fishing for them off the Yorkshire coast is as follows: three men go out in each of the boats, each man provided with three lines; every one of which is furnished with two hundred and eighty hooks, placed exactly six feet two inches asunder. These are coiled on an oblong piece of wicker-work, with the hooks baited,



and placed very regularly in the centre of the coil. When they are used, the nine are generally fastened together so as to form one line with above two thousand hooks, and extending near three miles in length. This is always laid across the current. An anchor and buoy are fixed at the end of each man's line. The boats for this purpose are each about a ton burthen, somewhat more than twenty feet in length, and about five feet in width.

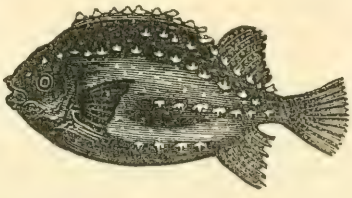
The general bait used for taking turbots is fresh herring cut into proper sized pieces, at which they bite most readily; they are also partial to the smaller lampreys, pieces of haddocks, sand-worms, muscles, and limpets; and when none of these are to be had, the fishermen use bullock's liver. They are so extremely delicate in the choice of their baits, as not to touch a piece of herring or haddock that has been twelve hours out of the sea; nor will they touch any bait that has been bitten by another fish.

THE SOLE.[1]



This well-known and delicious fish is remarkable for one extraordinary circumstance; they have been known to feed on shell-fish, although they are furnished with no apparatus whatever in their mouth for reducing them to a state calculated for digestion. The stomach, however, has a dissolvent power, which makes up for the want of masticating apparatus. But the most usual food for soles is the spawn and young of other fish.

THE LUMP FISH, LUMPSUCKER, OR SEA OWL,[2]



Is sixteen inches in length, and its weight about four pounds; the shape of the body is like that of the bream, deep, and it swims edgewise, the back is sharp and elevated, and the belly flat; the lips, mouth, and tongue of this animal are of a deep red; the whole skin is rough, with bony knobs, the largest row is along the ridge of the back; the belly is of a bright crimson color; but what makes the chief singularity in this fish, is an oval aperture in the belly, surrounded with a fleshy, soft substance, that seems bearded all round; by means of this part it adheres with vast force to any thing it pleases. If flung into a pail of water, it will stick so close to the bottom, that on taking the fish by the tail, one may lift up pail and all, though it hold several gallons of water. Great numbers of these fish are found along

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[1] *Solea vulgaris*, Cuv. This genus has the mouth twisted to the side opposite to the eyes; jaws destitute of teeth on the eye side; body oblong; dorsal fin commencing at the mouth, and running, as well as the anal fin, to the tail; lateral line straight.

[2] *Cyclopterus lumpus*, Lin. This genus has the mouth large, with very small pointed teeth in both jaws; pectoral fin, and large ventral fins united in the form of an oval and concave disc; bronchial membrane with six rays; skin viscid and without scales.

the coast of Greenland, in the beginning of summer, where they resort to spawn. Their roe is remarkably large, and the Greenlanders boil it to a pulp for eating. They are extremely fat, but not admired in England, being both flabby and insipid.

ORDER VIII.—MALACOPTERYGII APODES.

These fishes have the body elongated, with thick skin, and destitute of ventral fins.

THE EEL.[1]

The common eel is a very singular fish in several things that relate to its natural history, and in some respects borders on the nature of the reptile tribe.

It is known to quit its element, and, during night, to wander along the meadows, not only for change of habitation, but also for the sake of prey, feeding on the snails it finds in its passage.

During winter, it beds itself deep in the mud, and continues in a state of rest like the serpent kind. It is very impatient of cold, and will eagerly take shelter in a wisp of straw, flung into a pond in severe weather, which has sometimes been practised as a method of taking them. Albertus goes so far as to say, that he has known eels to shelter in a hay-rick, yet all perished through excess of cold.

The eyes are placed not remote from the end of the nose; the irides are tinged with red; the under jaw is longer than the upper; the teeth are small, sharp, and numerous; beneath each eye is a minute orifice; at the end of the nose two others, small, and tubular. This fish is furnished with a pair of pectoral fins, rounded at their ends; another narrow fin on the back, uniting with that of the tail; and the anal fin joins it in the same manner beneath. Behind the pectoral fins is the orifice to the gills, which are concealed in the skin.

Eels vary much in their colors, from a sooty hue, to a light olive-green; and those which are called silver eels have their bellies white, and a remarkable clearness throughout.

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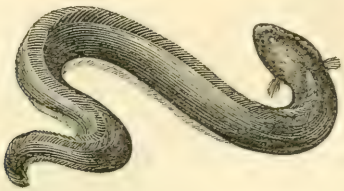
[1] *Anguilla vulgaris*, Cuv. This genus has the body rounded, elongated, smooth; bronchial openings lateral, placed under the pectoral fins; pectoral fins large; dorsal and anal fins united, and forming a pointed caudal fin.

THE CONGER EEL.[1]

The conger eel grows to an immense size, and its fierceness is equal to its magnitude; they have been taken ten feet and a half long, and eighteen inches in circumference in the thickest part. They differ from the common eel not only in their size, but in being of a darker color, and in the form of the lower jaw, which is shorter than the upper. They are extremely voracious, and prey upon other fish, particularly upon crabs, when they have cast their shell. The fishermen are very fearful of the large congers, lest they should endanger their legs by clinging round them; they therefore kill them as soon as possible, by striking them on the navel. In April, 1808, one was taken at Yarmouth, England, which knocked down its captor before it could be secured. On the coast of Cornwall, these fish constitute a considerable article of commerce, where they are salted and dried, and afterwards ground to powder, which is purchased by the Spaniards, for the purpose of thickening their soups.

THE ELECTRICAL EEL[2]



Is common in South America. It is from three to five feet in length, and ten or twelve inches in circumference in the broadest part of the body; and has the capability of swimming backward as well as forward. Their color is an olive-green, and the head yellow, mingled with red. The head is flat, and the mouth wide and toothless. From the point of its tail to within six inches of its head, extends a fin about two inches deep, and which is an inch thick at its junction with the body. As there are several annular divisions, or rather rugæ of the skin, across the body, it would seem that the fish

[1] *Conger vulgaris*, Cuv. The genus *Conger* has the dorsal fin commencing near the pectoral fins, or over them; upper jaw longer than the under.

[2] *Gymnotus electricus*, Lin. The characteristics of this genus are, bronchial openings in part closed by a membrane opening before the pectoral fins; anus placed much forward, the anal fin running along the greater part of the body; no dorsal fin; skin without perceptible scales.

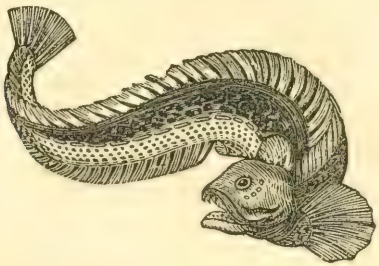
partakes of the vermicular nature, and can contract or dilate itself at pleasure.

The electrical shock in conveyed either through the hand, or any metallic conductor which touches the fish; and a stroke of one of the largest kind, if properly applied, would prove instant death to even the human species. This extraordinary power is given to this fish, not only for defence, but subsistence. For whenever small fishes or worms are thrown into the water, they are first struck dead by the electric power of the animal, and afterwards swallowed by him.

ORDER IX.—ACANTHOPTERYGII.

These fishes have the first rays of the dorsal, ventral and anal fins supported by simple spinous rays.

THE WOLF FISH.[1]



This animal seems to be confined to the northern seas, and sometimes is found near the coasts of Scotland. It grows to a very large size, being frequently taken of the length of seven feet, and even more. It is a most ravenous and fierce fish, and when taken, fastens upon every thing within its reach. It is said even to bite so hard, that it will seize upon an anchor, and leave the marks of its teeth on it. It feeds almost entirely on shell-fish, the hardest of which it easily crushes with its jaws. It has so formidable and disagreeable appearance, that it is only eaten by the fishermen, who, however, prefer it to halibut.

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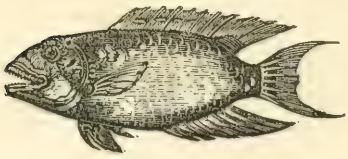
[1] *Anarchicas lupus*, Lin. This genus has the body long, smooth; head thick and obtuse; anterior teeth long and conical; the others, bony tubercles, with small enamelled teeth on their summits; six rays in the bronchial membrane.

THE GILT-HEAD[1]



Takes its name from its predominant color, the forehead and sides resembling gold, though the latter are tinged with brown. It has but one back fin, which reaches the whole length of the body. In form, it in some degree rerembles the bream. It is found in deep waters, on bold rocky shores; it subsists chiefly on shell-fish, and some of the species grow to the weight of ten pounds.

Besides the lunated, which is the most common, and takes its name from a semi-lunar gold spot under the eyes, there are the red, and the toothed or streaked gilt-heads, the last of which is distinguished by two canine teeth on each side.

THE MULLET[2]

Was formerly much celebrated as a treat for the epicure, and frequent allusions to it are found in the ancient satirists. It is a fish of an elegant form; is generally found by the seashores, where it roots like a hog, in the sand or mud, and it is so active, that it frequently escapes, by leaping out of the fishermen's nets. The head is almost square, and is flat at the top. It has no teeth, only in the upper lip is a small roughness. The tail is much forked. The color of the back is dusky, marked with blue and green. The sides silvery, marked with dusky lines, reaching from the head to the tail. The belly is silvery.

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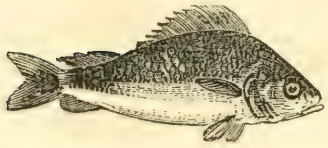
[1] *Daurada auratus.* The genus *Daurada* has the head compressed; jaws slightly extensible, with four or six conical teeth in one row; the others flat.

[2] *Mugil cephalus*, Lin. The genus *Mugil* has the head depressed, broad, and scaly; ventral fins under the abdomen; and two short dorsal fins; mouth with fleshy and crenulated lips; lower jaw with a carination in the middle, entering into a corresponding groove in the upper; no teeth; bronchial membrane with three rays.

THE PERCH[1]



Is a gregarious fish, and loves deep holes, and gentle streams. It is a most voracious fish and eager biter; if the angler meets with a shoal of them, he is sure of taking every one. It is a common notion, that the pike will not attack this fish, being fearful of the spiny fins which the perch erects on the approach of the former. This may be true in respect to large fish; but it is well known the small ones are the most tempting bait that can be laid for the pike.

The perch is a fish very tenacious of life; we have known them carried near sixty miles in dry straw, and yet survive the journey. These fish seldom grow to a large size.

THE MACKEREL.[2]

The mackerel emits a phosphoric light when fresh from the sea. When taken out of the water, it soon dies, and even in the water, if it advance with too much impetuosity against the net. It is caught with that instrument, or with a hook baited with bits of red cloth, or small herrings, and pieces of other kinds of fish or flesh. In some places it is taken by lines from boats, as during a fresh gale of wind, it readily seizes a bait; it is necessary that the boat should be in motion, in order to drag the bait along near the surface of the water. There is a great fishery for mackerel on some parts of the west coast of England. This is of such an extent, as to

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[1] *Perca fluviatilis*, Lin. The genus *Perca* has a snout without scales, not advancing beyond the lips; second dorsal fin not sensibly longer than the first; ventral fins on the thorax; præ-operculi dentated; operculi spinous.

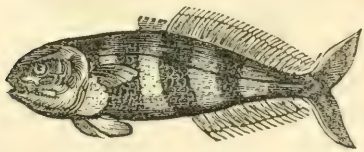
[2] *Scomber scomber*, Lin. The genus *Scomber*, or mackerel, has a projecting ridge on each side of the tail, and a row of pointed teeth in each jaw; anal and dorsal fins with the posterior part divided into spurious fins; the second dorsal, distant from the first.

employ in the whole, a capital of nearly two hundred thousand pounds. The mackerel fishery on the coast of New England is very productive. It is carried on in small schooners of twenty or thirty tons.

THE TUNNY[1]

Retains not only the character, but the habits of the mackerel. They resort in vast shoals to the Mediterranean, at certain seasons, and, from the earliest periods of history, have constituted a considerable branch of commerce there. The tunny, however, differs greatly from the mackerel in size. One which Mr Pennant saw at Inverary in Scotland, weighed four hundred and sixty pounds. It was seven feet ten inches in length, and the circumference in the largest part was five feet seven, and near the tail only one foot six. The pieces, when fresh cut, appear like raw beef but when boiled turn pale, and have something the flavor of salmon.

THE PILOT FISH[2]



Has a long and banded body, with four loose spines on the back; a compressed head, rounded off in front; a small mouth, the jaws of which are of equal length, and furnished with small teeth. The palate has a curved row of teeth, and the tongue has teeth all along.

This species is found in the Mediterranean, Southern ocean, East Indies, and Cape of Good Hope. It grows to a foot and a half in length, and derives its name from being commonly seen with the shark, to which it appears to point out its prey. The circumstance of its guiding the shark,

[1] *Thynnus vulgaris*, Cuv. This genus has a projecting ridge on each side of the tail, and a row of pointed teeth in each jaw; anal and second dorsal fins subdivided; first dorsal fin prolonged almost to the second, and sometimes touching it.

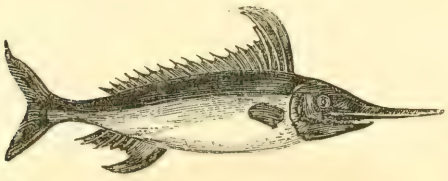
[2] *Centronotus ductor*, Lacep. This genus has one dorsal fin with spines before; ventral fins supported, as in general, by some rays, the most of which are short; sides of the tail carinated; anal shorter than the dorsal fin, with sometimes free spines.

was long a matter of doubt, but appears now to be an ascertained fact. M. Geoffroy, when near Malta, in 1798, saw two of the pilot fish lead a shark to a piece of bacon, which a seaman had let down by a line and hook.

THE DORY, OR DORADO.[2]

The form of this fish is very disgusting. Its body is oval, and much compressed at the sides. Its snout is long, and its mouth is wide. The first back fin consists of ten spiny rays, with long filaments; the second of twenty-four soft rays. The tail is round at the end. The color of the body is olive, varied with light blue and white; while living, it has the appearance of gilding, whence its name *Dorée* (gilt). It is found in the North sea, the British channel, the Atlantic, and the Mediterranean.

THE SWORD FISH[1]



Is very common in the Mediterranean, and is much esteemed for food by the Sicilians, who consider it as equal to the sturgeon. It is also found on the coasts of America. It grows to a very large size, upwards of twenty feet in length. It is of a long and rounded body, largest near the head, and tapering by degrees to the tail. The skin is rough, the back black, and the belly white. It has one fin on the back, running almost its whole length. It has one pair of fins also at the gills. But the most remarkable part of this fish is the snout, which, in the upper jaw, runs out in the figure of a sword, sometimes to the length of three feet, and is of a substance like a coarse kind of ivory. The under jaw is much shorter.

[1] *Zeus faber*, Lin. This genus is characterized by a body oval, compressed; jaws strongly protractile; teeth crowded; spinous portions of the dorsal and anal fins separated from the others by a deep notch; scales projecting, and spinous scales at the base of the vertical fins, and between the ventral and anal fins.

[2] *Xiphias gladius*, Lin. The genus *Xiphias* has the snout prolonged, resembling the blade of a sword; strong asperities in the jaws, in the place of teeth; body elongated rounded, with scarcely perceptible scales or projecting carinæ on each side of the tail; pectoral fins long and pointed; two or three anterior rays of the dorsal fin spinous; no ventral fin.

The sword fish has wonderful strength. The Leopard man-of-war was struck by one of them; and though the animal was following the ship, and consequently gave the blow with less force than it otherwise would have done, yet the sword penetrated nearly a quarter of a yard through the sheathing and timber, and was broken off by the shock. Eight or nine strokes from a nammer weighing a quarter of a hundred weight, would be required, to drive an iron pin the same depth into wood. In the British Museum there is also a plank of a ship, through which a fish impelled the whole length of his sword; not, however, without losing his life by the effort.

The sword fish has an antipathy to the whale, and no sooner meets than he assails him. Two will sometimes combine in the attack. The whale can defend himself only with his tail, which the activity of his adversary generally enables him to evade. The whale dives in vain, for he is pursued by his pertinacious tormentor, and he is at length compelled to take flight.

INVERTEBRAL ANIMALS.

The animals destitute of a vertebral column and bony skeleton, form the second, and, by far, the most numerous, group of living beings. In the system of Linnæus, the invertebral animals were included in two great classes, *Insecta* and *Vermes*. But subsequent investigations into their nature and organization, have given rise to more numerous and better characterized groups. Possessing little analogy in point of structure with the vertebral animals, some are found with the body unprotected, except by a soft skin; others are covered by a shell; while others have their members enveloped in crustaceous plates. The circulating system in this division is also less perfect than in the vertebral animals; and, with the exception of a few groups, none have red blood. The nervous system appears also in a less complete form; and, instead of the medullary mass of the brain and spinal chord of the higher classes, they present only ganglions or knots in the nervous thread. No class of invertebral animals possesses all the organs of sense; for while some are destitute of the organs of hearing, others seem deprived of the faculty of smell and sight, and many appear to be guided only by the sense of touch. The sexes, besides, are in many groups united in the same individuals, and in others the species is continued in a process analogous to the budding of vegetables.

The animals of this division are but feebly endowed with the functions of relation. Many of them, indeed, almost deprived of locomotion, or fixed to other bodies, have neither choice of situation or food, but remain for the term of life in the places where they originally had their birth. But the want of intelligence is largely made up to many classes of this division, by their superior instinctive powers, which, in as far as regard their subsistence and reproduction, surpass that of the vertebral animals. In one very large class, the insects, this instinctive intelligence is displayed in a very striking manner, in the combination of individuals for one common purpose, and in the wonderful subsidiary arrangements of their commonwealths. It has been observed, as a distinction between the vertebral and the invertebral animals, that while in the former, the bones or hard parts are more o less formed of phosphate of lime; the hard parts of the latter, such as the shells of the mollusca and crustacea, and the stony matter of corals and madrepores, are chiefly composed of carbonate of lime. The invertebral animals, as noticed in the introduction, are arranged by Cuvier into three great divisions. 1. Those which have no skeleton; in which the muscles are attached only to the skin, which proves a soft contractile covering, in

which the nervous system, composed of scattered masses, is contained in this general envelope; in which there is a complete circulating system, particular organs for respiration, and organs for digestion and secretion, are termed Mollusca. 2. The second division, including those animals in which the trunk is divided transversely into a certain number of rings, and of which the integuments, either hard or soft, have always the muscles attached to their interior, is named Articulata. The nervous system in this division consists of long threads, running along the belly, and thickened at certain distances into knots or ganglions; and the body is, in most cases, provided with jointed members, or legs, at the sides of the annular segments. Their jaws, whenever they have any, are always lateral. 3. The third great division includes all the animals known under the name Zoophytes, to which Cuvier gives the name of Radiata. In the preceding divisions, the organs of movement and sensation are disposed symmetrically on the two sides of a common axis. In the present, they are arranged circularly around a common centre. In this last division, too, the lowest in the scale of animated beings, the nervous and circulating system almost disappears, the respiratory apparatus is almost always on the surface of the body; and in the greater number, the intestinal canal presents the appearance of a simple sac without an outlet. The last families of this division present the appearance of a homogenous pulp, indistinctly perceived to possess animal life, from giving indications of motion and sensation.

CLASS I. MOLLUSCA.

Invertebral, soft, inarticulated animals, furnished with a more or less prominent head at their anterior part.

The form of the body in the mollusca is extremely various. It is frequently oval, more or less elongated, convex above, and flat beneath, as in the genera *Doris*, *Limax*, &c. It is, also, sometimes oval, and equally convex above and below, as in the *Sepiæ*; elongated and cylindrical, as in certain *Loligines*; globular, as in the *Octopodes*. It is often more or less compressed on the sides, as in the *Scyllææ*. In very many cases, a large portion of the body is rolled up in a spiral form. A considerable number of these animals present a very distinct separation between the head and the rest of the body, as in the *Octopodes*. This distinction is sometimes much less marked, as in the genus *Doris*. The distinction of neck, breast, abdomen, and tail is still less obvious; the body forming only a simple mass. It is seldom that the body is furnished with organs of locomotion, properly so called, although cutaneous expansions are sometimes remarked on the sides, which are subservient to this purpose. The nervous system consists of a

central part or brain, situated above the intestinal canal; of ganglia for the different orders of sense, as well as for the locomotive apparatus; of a few visceral ganglia, together with conducting filaments or nerves. The brain consists of two similar parts, more or less connected, and situated above the œsophagus. The ganglion of the organ of sight communicates with the brain, as well as that of the organ of hearing, when it exists. Besides the more or less immediate connection which exists between the two parts of the brain, above the œsophagus, there is another which passes under the œsophagus, thus forming a sort of ring. These visceral ganglia appear to be only two in number. The principal one is commonly placed near the stomach, and sends forth filaments to the intestinal canal, and others which communicate with the brain, by means of the œsophageal ring. For the locomotive apparatus, and the organs of general sensation, there is but a single ganglion on each side, which communicates with the brain, by a chord. From this ganglion proceed the filaments that supply the musculo-cutaneous envelope, and especially those which are subservient to general locomotion, such as the foot of the *Gasteropoda* and *Trachelipoda*, the wings of the *Pteropoda*, &c. The circulation is complete in the mollusca. The heart is situated, in general, in the back, above the intestinal canal. It is not contained in a true pericardium, but in a muscular cell of the imperfect diaphragm, which separates the visceral cavity from that of the bronchial. It consists of an auricle, sometimes double, and a ventricle. The auricle varies in its forms, but is commonly oval, with very thin walls; a few muscular cords, however, are observed to traverse its interior. It communicates with the ventricle by a sort of contraction, frequently of considerable length, as for example in the genus *Loligo*, and by means of a narrow orifice, commonly transverse, situated between two folds of the inner surface of the ventricle, but without valves. The ventricle is in general much larger, and varies much in form and direction. Its walls are always much thicker than those of the auricle, and the transverse, muscular fasciculi, of which it is formed, are very distinct. From the extremity of the heart issues the arterial system, commonly by a single trunk, but sometimes, also, by two. There are no valves placed at the commencement of this vessel. Their walls are thicker than those of the veins, and are possessed of great elasticity. Their distribution varies in a considerable degree, although there are in general two trunks, an anterior and a posterior. The former furnishes branches to the head and its different parts, to the œsophagus, and even to the organs of generation; while the other sends ramifications to the stomach, the rest of the intestines, the liver, and the secreting organs of generation. The veins have their walls extremely thin, and frequently so confounded with the tissue of the parts, as to be with difficulty distinguished. They constitute only two systems, one which comes from all parts of the body, and the other from the respiratory organ, there being no system of the *vena portæ*. The venous radicles of the general system of the body, after repeat-

edly uniting into trunks, arrive at the respiratory organ, where they are converted into an arterial system, which ramifies through its substance. From the capillary extremities of the bronchial artery, arises the second venous system. The veins unite into branches, which terminate in a large trunk, pouring its contents into the heart. The color of the blood is white or bluish.

The organs of *respiration* vary considerably, not only in respect to their form, and the place which they occupy in the animal, but also with respect to structure. In most of them they are true bronchiæ, or receive the influence of the ambient fluid on their surface; while in some others, they form a sort of cavity, into which it penetrates, as in the terrestrial mollusca. In the latter animals, the bronchial cavity is always more or less oval; but in the aquatic species, it is found simple or compound. It consists of numerous ramifications in the *Tritoniæ*, of tufts or laminæ in other genera, of triangular pyramids in the *Loligines*, &c. In many genera it is external, as in the *Pteropoda;* while in others it is more or less internal. It is sometimes situate at the upper and posterior part of the body, as in the genus *Doris;* at other times, on each side of the back; most commonly, however, at the anterior and superior part of the commencement of the back. The structure of the respiratory organ has, in most species, a considerable resemblance to that of fishes, consisting either of triangular laminæ, like the teeth of a comb, or of granulations, or tubercles, arranged along a common axis.

The mouth is in general armed with hard parts. In some it is shut, with almost always two jaws; in others it consists of a retractile proboscis, furnished with small teeth at its internal orifice, and has no jaws. Those which have jaws, have the mouth sometimes vertical, presenting two bony, toothless jaws, hooked like a parrot's bill, sometimes placed under the head, or almost at its anterior extremity, or very small. It presents itself under the form of a longitudinal or transverse fissure, and terminates that part of the head which extends from the base of the tentaculæ to the aperture of the mouth, and which is named the snout. This snout is sometimes very short, and sometimes so elongated as to assume the appearance of a proboscis. In this latter case, however, it is always distinct from the true proboscis, which has no jaws, and is retractile. The two jaws of the kind of snout just mentioned, are cartilaginous and very unequal. Among those which are destitute of maxillæ, there are some which have, instead of them, a kind of cylindrical tube, of great length, in certain species, but much smaller in others. It is fleshy, muscular, contractile, and pliant. Its extremity is perforated by a round hole, margined by cartilaginous membrane, and armed with very small teeth.

The proboscidiferous mollusca are carnivorous, making use of this organ for perforating the shells of other animals, and sucking their flesh. Those which have the parrot beak, are also carnivorous. Those which have a

snout and two jaws, of which one, at least, is furnished with small teeth, are herbivorous or frugivorous.

The intestinal canal consists of an internal mucous membrane, commonly forming longitudinal folds, and a more or less distinct muscular layer It varies much in respect to its direction and enlargement. Sometimes there is a long and narrow œsophagus, and sometimes that organ is very large and wide. The stomach is frequently simple, but also divided into several cavities or cells. The liver, composed of lobes and lobules, is situated more or less behind the stomach, very frequently at the posterior part of the body. The ducts unite into three or four canals, which empty themselves into the stomach or intestine. The intestinal canal varies still more than the stomach in its diameter, the number and form of its circumvolutions, in its direction, and in the point at which it terminates. The organs of vision are largely developed in certain species, as in the genus *loligo;* in others, they are small and imperfect, and are borne at the extremity of a sort of tentaculum, or are sessile. The sense is in general very obscure, and in many species can scarcely be said to exist. The senses of hearing, of smell, and taste, are equally obtuse. The skin which envelopes the body of the mollusca, is peculiarly soft and spongy, and from its connection with the subjacent muscles, slightly contractile. It is smooth or tubercular, and generally secretes a large quantity of mucus. It obtains the name of mantle. Many species are naked; but by far the greater number are enveloped in a calcareous covering, named the shell. Of those which are naked, some are entirely soft in all their parts; while others contain internally, one or more solid parts, which are sometimes merely cartilaginous or horny, or cretaceous, and lamellar, without being really conchyliform, and sometimes constitute a true internal shell. Of the shells produced by the mollusca, there are, therefore, some which are truly internal, not appearing at all externally; in others, the shell is disclosed, in part, at the posterior extremity of the animal; while in a great portion, the shell is entirely external, and envelopes or covers the animal. The form of this external shell is extremely varied. In general, it is spirally convoluted. The principal parts which it presents, are the aperture or mouth, consisting of an inner or columellar lip, and an outer lip; the body of the shell consisting of the last, and generally tumid turn, or *whorl;* the spine, formed of the convolutions, which are only in part seen, because enveloped by the last turn; and the *columella*, or axis, round which the shell is contorted. When the columella is hollow, its opening is called the *umbilicus*. The shell consists of a mixture of calcareous matter, (carbonate of lime,) and gelatinous matter. This is frequently covered externally by a thin layer of the latter substance, forming what is called the *epidermis*. It exhibits a great variety of coloring. The form of the shell indicates that of the animal which inhabits it; and is used as furnishing the generic characters, the structure of the animals of this class not being generally known. It also furnishes many of the specific characters;

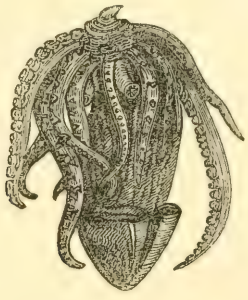
while the circumstance of its surface being smooth, or variously grooved, tuberculated, or marked with spines, supplies others. The immense variety in the coloring, also, affords obvious means of specific distinction. All the mollusca are oviparous. The reproduction is therefore necessarily effected by sexual impregnation. In some of the orders of these animals, the sexes are separate, as in the *Sepiaria*. These animals, however, do not copulate, but the males shed a fecundating fluid upon the ova deposited by the females. It appears that the other mollusca, such in particular as the *Gasteropoda* and *Trachelipoda*, have the two sexes united in the same individual. Of these hermaphrodites, some require a reciprocal copulation, while others appear to fecundate themselves. The ova of the mollusca are not in general hatched until after they have been deposited. Some have a crustaceous covering like the ova of birds and reptiles, as is the case with the *helices;* others are sometimes surrounded with a sort of jelly, by which they are attached together, as in the *planorbes*, *lymnæ*, &c., and others are contained in membranous sacs, of very different forms, sometimes solitary, but more commonly in groups; each of the sacs containing several young individuals, which issue from them alive, with their shell already formed, as is the case with the *Buccina*, &c. The mollusca are in general aquatic animals. Many species, however, are terrestrial; and some appear to live almost constantly under ground, such as the *testacellæ*, but this is rare. A great number are found on the surface, such as the *limaces*, *helices*, &c.; while some are to a certain degree amphibious, as the *lymnæ*. By far the greater part, however, live in water, fresh and salt. Of the fresh water kinds, some remain free at the surface of the mud; others adhere to other bodies. Of the latter, the circumstances, in this respect, are considerably varied. Some are found only on the coasts, and are termed *littoral* species, as the genera *patella*, *turbo*, &c.; others appear to exist only at a distance from the shores, and in deep water, whence they are called *pelagic* species; and the *Sepiaria* wander in the depths of the ocean. With respect to their geographical distribution, little is known, this subject not having been submitted to sufficient investigation. They are found, however, in all parts of the world, whether in the seas, rivers, and lakes, or on land. Certain tribes are confined to particular zones, while others appear to inhabit all. Thus the *Sepiaria* occur in all seas, while the *nautilus* and *spirula* are found only in the torrid zone. The food of the mollusca consists of almost all sorts of substances, animal and vegetable, in all states, living or dead, fresh or putrid; but each species is in general confined to a certain kind. The uses of the mollusca, in the economy of nature, are varied and extensive. They afford food to numerous animals, especially fishes and birds, and to man himself. The savage tribes which live along the coast, in many parts of the world, employ them much as an article of food. Even in civilized countries, the mollusca frequently form a considerable portion of sustenance, although in general they are neither very pleasant nor wholesome. The cuttle-fish furnishes a fluid from

which the pigment called China ink is procured; and the ancients extracted the beautiful purple color, with which the garments of their princes and nobles were dyed, from certain species of *purpuræ* inhabiting the coast of Tyre.

ORDER II.—CEPHALOPODA.

These animals are distinguished by having a mantle in the form of a bag, containing the lower part of the body; head protruding from the bag, crowned with inarticulated arms, furnished with cups or suckers, and surrounding the mouth; two sessile eyes; mouth with two horny mandibles; three hearts; the sexes separate.

THE GREAT CUTTLE-FISH.[1]



This singular creature, which is about two feet long, has eight arms or claws, furnished on the interior side with little round serrated cups, by the contraction of which the animal lays fast hold of any thing that comes in its way. Besides these eight arms, it has two tentacula, four times longer than the preceding, and also pedunculated. When the suckers adhere to any thing, it is very difficult to loosen their hold. The mouth is situated in the centre, and is horny and hooked, like the bill of a parrot. It is so strong that the animal can break to pieces the shells of limpets and of other marine, testaceous creatures on which it feeds. The eyes are below, and surrounded with several silvery rings; they are as large as the eyes of a calf, but are very prominent, and rather resemble the eyes of a crab. The

[1] *Sepia officinalis*, Lamarck. The genus *Sepia* has the body fleshy, depressed, contained in a bag, which is obtuse behind, and margined on either side in its whole length, by a narrow fin; a free, calcareous, spongy, and opaque bone included in the body near the back; mouth terminal, surrounded with ten arms furnished with cups, of which two are pedunculate, and longer than the others

body is of a reddish brown color, nearly cylindrical. The belly below is equal, soft, smooth, oblong-round, of an ash and faintly yellowish color; about the middle of the upper part of the body, there is a fin like those of fishes, composed of a softish cartilaginous substance, spread out widely on both sides, and decreasing towards the tail, till it ends in a point, like the broad fins of the ray fish; by means of this fin, it moves itself in swimming, having no other membrane for that purpose. From this pointed termination of the tail, the French call it the sea-spider, although it has scarcely any resemblance to the spider; but rather, with respect to the head, approaches to the shape of the star-fish. At any rate, they are very formidable animals. With their arms and trunks they fasten themselves, to resist the motion of the waves. The females lay their eggs upon seaweed and plants, in clusters like bunches of grapes. Immediately after they are laid, they are white, and the males pass over and impregnate them with a black liquor, after which they grow larger and resemble black grapes. On opening one of the eggs, the embryo cuttle is found alive. The noise of a cuttle-fish, on being dragged out of the water, resembles the grunting of a boar. When the male is pursued by a sea-wolf, or other ravenous fish, he shuns the danger by stratagem. He squirts out a black liquor, by which the water becomes as black as ink, and under shelter of this, he baffles the pursuit of his enemy. This black liquor is elaborated in a particular gland. The Romans used it as ink; and it is said to be an ingredient in the composition of Indian ink. There is a bone in this animal which is converted into that useful article of stationary called pounce, and is also used by silversmiths to form moulds. This fish was much esteemed by the ancients, and is still eaten in the hot countries bordering on the Mediterranean.

THE NAUTILUS.[1]

This animal inhabits a shell which resembles that of a large snail, but is generally six or eight inches across; within, it is divided into forty partitions, that communicate with each other by doors, if we may so call them, through which one could not thrust a goose quill; almost the whole internal part of the shell is filled by the animal, the body of which, like its habitation, is divided into as many parts as there are chambers in its shell; all the parts of its body communicate with each other, through the doors or openings, by a long vessel, which runs from the head to the tail; thus the body of the animal, if taken out of the shell, may be likened to a number of soft bits of flesh, of which there are forty threaded upon a string. From this

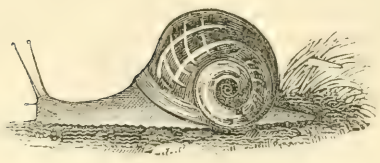
[1] *Nautilus Pompilius*, Lin. Shell disciform, spiral, multilocular, with simple walls; turns contiguous, the last covering the rest; transverse septa, concave externally, perforated in the disc; the margins entire.

extraordinary conformation, one would not be apt to suppose that the nautilus sometimes quitted its shell, and returned to it again; yet nothing, though seemingly impossible, is more certain. The manner by which it contrives to disengage every part of its body from so intricate a habitation—by which it makes a substance, to appearance as thick as one's wrist, pass through forty doors, each of which would scarcely admit a goose quill—is not yet discovered; but the fact is certain; for the animal is often found without its shell; and the shell more frequently destitute of the animal. It is most probable, that it has a power of making the substance of one section of its body remove up into that which is next; and thus, by multiplied removals, it gets free.

But this, though very strange, is not the peculiarity for which the nautilus has been the most distinguished. Its spreading the thin oar, and catching the flying gale, to use the poet's description of it, has chiefly excited human curiosity. These animals, particularlarly those of the white, light kind,[1] are chiefly found in the Mediterranean; and scarce any who have sailed on that sea, but must have often seen them. When the sea is calm, they are observed floating on the surface; some spreading their little sail; some rowing with their feet, as if for life and death; and others still, floating upon their mouths, like a ship with the keel upward. If taken while thus employed, and examined, the extraordinary mechanism of their limbs for sailing, will appear more manifest. The nautilus is furnished with eight feet, which issue near the mouth, and may as properly be called barbs; these are connected to each other by a thin skin, like that between the toes of a duck, but much thinner, and more transparent. Of these eight feet thus connected, six are short, and these are held up as sails to catch the wind in sailing; the two others are longer, and are kept in the water; serving, like paddles, to steer their course by. When the weather is quite calm, and the animal is pursued from below, it is then seen expanding only a part of its sail, and rowing with the rest; whenever it is interrupted, or fears danger from above, it instantly furls the sail, catches in all its oars, turns its shell mouth downward, and instantly sinks to the bottom. Sometimes also it is seen pumping the water from its leaking hulk; and, when unfit for sailing, deserts its shell enurely. The forsaken hulk is seen floating along, till it dashes, by a kind of shipwreck, upon the rocks or the shore.

[1] *Argonauta Argo*, Lam.

THE SNAIL.[1]



This animal is furnished with the organs of life in a manner almost as complete as the largest animal; with a tongue, brain, salival ducts, glands, nerves, stomach and intestines, liver, heart, and blood-vessels; besides these, it has a purple bag that furnishes a red matter to different parts of the body, together with strong muscles that hold it to the shell, and which are hardened, like tendons, at their insertion.

But these it possesses in common with other animals. We must now see what it has peculiar to itself. The first striking peculiarity is, that the animal has got its eyes on the points of its largest horns. When the snail is in motion, four horns are distinctly seen; but the two uppermost and longest deserve peculiar consideration, both on account of the various motions with which they are endued, as well as their having their eyes fixed at the extreme ends of them. The eyes the animal can direct to different objects at pleasure, by a regular motion out of the body; and sometimes it hides them, by a very swift contraction into the belly. Under the small horns is the animal's mouth; and though it may appear too soft a substance to be furnished with teeth, yet it has not less than eight of them, with which it devours leaves, and other substances, seemingly harder than itself; and with which it sometimes bites off pieces of its own shell.

At the expiration of eighteen days after coupling, the snails produce their eggs, and hide them in the earth with the greatest solicitude and industry. These eggs are in great numbers, round, white, and covered with a soft shell; they are also stuck to each other by an imperceptible slime, like a bunch of grapes, of about the size of a small pea.

The snail is possessed not only of a power of retreating into its shell, but of mending it when broken. Sometimes these animals are crushed seemingly to pieces, and to all appearance utterly destroyed; yet still they set themselves to work, and, in a few days, mend all their numerous breaches. The same substance by which the shell is originally made, goes to the re-establishment of the ruined habitation.

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[1] *Helix.* Shell orbicular, convex or covered, sometimes globular, with the spire slightly elevated; aperture entire, broader than long, very oblique, contiguous to the axis of the shell, having the margin disunited by the projection of the penultimate whorl.

As the snail is furnished with all the organs of life and sensation, it is not wonderful to see it very voracious. It chiefly subsists upon the leaves of plants and trees, but is very delicate in its choice. At the approach of winter, it buries itself in the earth, or retires to some hole to continue in a torpid state, during the severity of the season. It is sometimes seen alone, but more frequently in company in its retreat; several being usually found together, apparently deprived of life and sensation. For the purpose of continuing in greater warmth and security, the snail forms a cover or lid to the mouth of its shell with its slime, which stops it up entirely, and thus protects it from every external danger. When the cover is formed too thick, the snail then breaks a little hole in it, to correct the effect of that closeness which proceeded from too much caution. In this manner, sheltered in its hole from the weather, defended in its shell by a cover, it sleeps during the winter; and for six or seven months, continues without food or motion, until the genial call of spring breaks its slumber, and excites its activity.

The snail, having slept for so long a season, awakes in one of the first fine days of April, breaks open its cell, and sallies forth to seek for nourishment. At first, it is not very difficult in the choice of its food; almost any vegetable that is green seems welcome; but the succulent plants of the garden are chiefly grateful; and the various kinds of pulse are, at some seasons, almost wholly destroyed by their numbers. A wet season is generally favorable to their production; for this animal cannot bear very dry seasons, or dry places, as they cause too great a consumption of its slime, without plenty of which it cannot subsist in health and vigor.

CLASS II.—CONCHIFERA.[1]

Animal soft, inarticulated, destitute of head or eyes, and always fixed in a valve shell; bronchiæ external; circulation simple; heart unilocular.

The animals of this class have no apparent head; and their mouth concealed under the mantle, or at the junction of its two lobes, and destitute of jaws or hard parts, appears to be as the orifice of a short œsophagus. The mantle or cloak which envelopes the body is large, in two lobes, and incloses the trunk, like the cover of a book. In some families, however, this mantle is united before, and then forms a tubular covering, open at both ends. The mantle, besides, often forms two tubes or syphons, of which one conducts the water to the bronchiæ, and the other serves as a canal for dejections. This mantle is always furnished with a shell of two valves, united by a hinge or ligament; and strong transverse muscles, attached to the

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([1] *Mollusca acephala*, Cuv.)

shell, enable the animal to open or shut it at pleasure. The nervous system in this class is imperfectly developed, sensation very obtuse, and the brain, if such it may be termed, is a ganglion over the mouth, formed by the junction of two nervous chords. Their chief sense seems to be that of touch. In some families, this sense appears to reside in tentacular filaments, which border the lobes of the mantle, or certain places of these lobes. These tentacular threads, which appear very sensible, or at least irritable, are, in general, numerous, short, very fine, and move sometimes with extreme quickness. The heart in the *Conchifera* is placed towards the back. It is small, but provided with venous and arterial vessels. The liver is large, embracing the stomach and a great portion of the alimentary canal. The bronchiæ are external, and appear more particularly so in those in which the mantle is open before. These bronchiæ are opposite, formed of large vascular leaflets, generally crescent-shaped, placed on each side under the cloak, covering the belly of the animal, upon the sides of which they are attached in pairs. These bronchiæ are formed of a tissue of small vessels, arranged close together, like the pipes of an organ. At the sides of the mouth are four triangular thin leaflets, the extremities of two lips. All the *Conchifera* have a testaceous covering of two principal pieces, most of them of two alone. These pieces, named *valves*, are opposed to one another, and constitute the proper shell of the animal. The valves are united together near their base, by an elastic coriaceous or horny ligament, and the point of union is called the *hinge*. This hinge is distinguished by *teeth*, or protuberances and hollows, which lock into each other when the shell is closed. When the valves are unequal or dissimilar in size, the shell is said to be *inequivalve;* and when, on the contrary, both resemble one another, in their general form and size, they are said to be *equivalve*. Among the equivalve shells, however, are found some, which, when the shell is closed, have, towards their lateral extremities, an opening or gape, more or less considerable. In those in which this opening is large, it has been observed that the mantle of the animal is almost always united before.

The ligament of the valves is sometimes exterior, and sometimes interior. In both cases, it serves not only to fix the two portions of the shell together, but to open them by its elasticity. When this ligament is exterior, if the shell be closed, it is then tense, the valves being held together by the contraction of the internal muscle; but if this muscle is relaxed, the elasticity of the ligament alone separates the valves. When, on the contrary, the ligament is interior, it is compressed when the shell is shut, and the muscle exerts its power, but throws open the valves when this power is relaxed. Though the *Conchifera* never crawl on a ventral disc, or foot, like many of the *Mollusca*, yet some possess a muscular, contractile organ, often compressed and lamelliform, which the animal exerts or withdraws at will. This muscular part serves some families as an organ of locomotion, by enabling them to execute a sort of leap; in others, deprived of locomotion

to attach their tendinous threads or byssus to rocks or marine bodies. As the movements of this class are thus nearly reduced to those of their muscular attachment to the shell and their muscular cloak, these parts are much developed. The thickness of the muscle which attaches the oyster to its shell, and the amplitude of the mantle in all the Conchifera, are well known. The disposition of the first of these has afforded characters for the determination of groups. In the oyster, for instance, there is but one muscle, which traverses, in some measure, the whole body to attach it to the valves of the shell. In others, such as the genera *Venus* and *Tellina*, the muscles of attachment are two in number, and attached to the lateral extremities of the shell; and in a third group, these muscles seem divided, as in the *Anodonta*, into three or four muscles of attachment. The muscles of attachment are generally thick, composed of straight vertical fibres, and at their place of junction with the shell acquire a remarkable hardness. Their use is to shut the valves by contraction; when they are relaxed, the ligament at the hinge suffices by its elasticity to open them. It is remarkable, that during the life of the animal, these muscles really change their place, without ceasing, for an instant, to attach the animal to the shell. They become obliterated, dried up, and detached, by almost imperceptible degrees on one side; while on the other, they increase by the addition of new fibres; and this is done in such a manner that they always preserve the same relative position as the shell increases in size from age. When the animal is removed from the shell, the muscles of attachment always leave on its internal surface impressions which show their situation, their number, and the displacement which they have undergone. Among the Conchifera, the animal never has a shell, or other hard part internally. The body is always soft, often oval, more or less compressed, and the mouth is generally situate towards the lowest part of the shell, on the left side of the hinge. All the Conchifera are aquatic. Some races live in fresh water, and others in the sea. The greater part are free; but some are fixed upon marine bodies by their shell, and others attached by bony filaments, or a byssus. Lamarck divides the class Conchifera into two orders, viz. Order first—Monomyaria. With but one muscle of attachment; shell marked interiorly with one subcentral muscular impression. Order second—Dimyaria. With at least two muscles of attachment; shell marked interiorly with two separate and lateral muscular impressions. It is not necessary to detail here all the arrangements proposed for this class of animals. They were included by Linnæus among his *Vermes testacea*, and form the class of *Mollusca acephala* in the *Régne Animal* of M. Cuvier. The older naturalists, who arranged the testaceous animals as one great family by the from of their testaceous covering, took their characters wholly form the shell; and this department of science, including the testaceous coverings of the preceding class, form the branch of science termed *Conchology*.

THE MUSCLE,[1]

As is well known, consists of two equal shells, joined at the back by a strong muscular ligament that answers all the purposes of a hinge. By the elastic contraction of this, the animal can open its shells, at pleasure, about a quarter of an inch from each other. The fish is fixed to either shell by four tendons, by means of which it shuts them close, and keeps its body firm from being crushed by any shock against the walls of its own habitation. It is furnished, like all other animals of this kind, with vital organs, though these are situated in a very extraordinary manner. It has a mouth furnished with two fleshy lips; its intestines begin at the bottom of the mouth, pass through the brain, and make a number of circumvolutions through the liver; on leaving this organ, they go on straight into the heart, which they penetrate, and end in the anus; near which the lungs are placed, and through which it breathes, like those of the snail kind; and in this manner its languid circulation is carried on.

The multitude of these animals in some places is very great; but from their defenceless state, the number of their destroyers is in equal proportion.

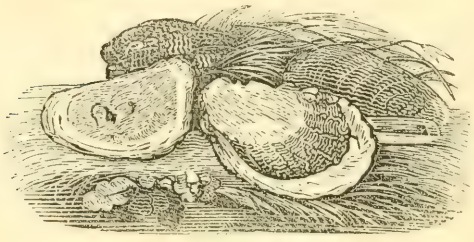
But notwithstanding the number of this creature's animated enemies, it seems still more fearful of the agitations of the element in which it resides; for if dashed against rocks, or thrown far on the beach, it is destroyed without a power of redress. In order to guard against these, which are to this animal the commonest and the most fatal accidents, although it has a power of slow motion, which we shall presently describe, yet it endeavors to become stationary, and to attach itself to any fixed object it happens to be near. For this purpose it is furnished with a very singular capacity of binding itself by a number of threads to whatever object it approaches; and these Reaumur supposed it to spin artificially, as spiders their webs, which they fasten against a wall. Of this, however, later philosophers have found very great reason to doubt. It is, therefore, supposed that these threads, which are usually called the beard of the muscle, are the natural growth of the animal's body, and by no means produced at pleasure.

Its instrument of motion, by which it contrives to reach the object it wants to bind itself to, is that muscular substance resembling a tongue, which is found long in proportion to the size of the muscle. In some, it is two inches long; in others, not a third part of these dimensions. This the animal has the power of thrusting out of its shell; and with this, it is capable of making a slight furrow in the sand at the bottom. By means of this furrow, it can erect itself upon the edge of its shell; and thus continuing to

[1] *Mytilus*. Shell longitudinal, equivalve, regular, pointed at the base, and adhering by a byssus: beaks almost straight, terminal, and pointed; hinge lateral, generally without teeth; ligament marginal, subinterior; muscular impression elongated, clavate sublateral.

make the furrow in proportion as it goes forward, it reaches out its tongue that answers the purpose of an arm, and thus carries its shell edgewise, as in a groove, until it reach the point intended. There where it determines to take up its residence, it fixes the ends of its beard, which are glutinous, to the rock or the object, whatever it be; and thus, like a ship at anchor, braves all the agitations of the water. The beards have been seen a foot and a half long; and of this substance the natives of Palermo sometimes make gloves and stockings.

THE OYSTER[1]



Is formed with organs of life and respiration, with intestines which are very voluminous, a liver, lungs, and heart. Like the muscle, it is self-impregnated; and the shell, which the animal soon acquires, serves it for its future habitation. Like the muscle, it opens its shell to receive the influx of water, and, like that animal, is strongly attached to its shells both above and below. The oyster respires by means of gills. The water is drawn in at the mouth, which is a small opening in the upper part of the body, and proceeds thence down a long canal, constituting the base of the gills, and so out again, the animal retaining such a portion of air as is necessary for the functions of the body.

The oyster differs from the muscle in being utterly unable to change its situation. It is entirely without that tongue which we see answering the purposes of an arm in the other animal, but, nevertheless, is often attached very firmly to any object it happens to approach. Nothing is so common in the rivers of the tropical climates as to see oysters growing even amidst the branches of the forest. Many trees, which grow along the banks of the stream, often bend their branches into the water, and particularly the mangrove, which chiefly delights in a moist situation. To these the oys-

[1] The genus *Ostrea*, or oyster, is characterized by an adhering shell, inequivalve, irregular, with beaks separated, and the upper valve advanced as the animal increases in age; hinge without teeth; ligament half internal; the hollow of attachment and the beak in the lower valve increasing with age.

ters hang in clusters, like apples upon the most fertile tree; and in proportion as the weight of the fish sinks the plant into the water, where it still continues growing, the number of oysters increase, and hang upon the branches. This is effected by means of a glue proper to themselves, which, when it cements, the joining is as hard as the shell, and is as difficultly broken.

Oysters usually cast their spawn in May, which at first appears like drops of candle-grease, and sticks to any hard substance it falls upon. These are covered with a shell in two or three days; and in three years the animal is large enough to be brought to market. As they invariably remain in the places where they are laid, and as they grow without any other seeming food than the afflux of sea water, it is the custom where the tide settles in marshes on land, to pick up great quantities of small oysters along the shore, which, when first gathered, seldom exceed the size of a sixpence. These are deposited in beds where the tide comes in, and in two or three years grow to a tolerable size. They are said to be better tasted for being thus sheltered from the agitation of the deep; and a mixture of fresh water entering into these repositories, is said to improve their flavor, and to increase their growth and fatness. Most of the oysters sold in Boston are taken in some part of Long Island Sound, and kept a year at Cape Cod, where they grow much larger, and are better than when first taken.

The oysters, however, which are prepared in this manner, are by no means so large as those found sticking to rocks at the bottom of the sea, usually called rock oysters. These are sometimes found as broad as a plate, and are admired by some as excellent food. But what is the size of these compared to the oysters of the East Indies, some of whose shells we have seen two feet over? The oysters found along the coast of Coromandel are capable of furnishing a plentiful meal to eight or ten men; but it seems universally agreed that they are no way comparable to ours for delicacy or flavor. The oysters taken on the coast of England have a strong taste of copper, which they derive from the copper banks. They are, at first, very disgusting to an American palate.

THE PEARL OYSTER[1]

Has a large, strong, whitish shell, wrinkled and rough without, and within smooth, and of a silver color. From these the mother-of-pearl is taken, which is nothing more than the internal coats of the shell, resembling the pearl in color and consistence. There are a great number of pearl fisheries

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[1] *Meleagrina margaritifera.* Lin. The genus *Meleagrina* has a shell subequivalve, rounded, scaly without; a sinus at the posterior base of the valves for the passage of the byssus, the left valve being notched and narrow at this place; hinge linear without teeth; ligament marginal, elongated, almost exterior, dilated in the middle

in America and Asia. The chief of these is carried on in the Persian gulf and at Ceylon.

The wretched people that are destined to fish for pearls, are either negroes or some of the poorest of the natives of Persia. The divers are not only subject to the dangers of the deep, to tempests, to suffocation at the bottom, to being devoured by sharks, but, from their profession, universally labor under a spitting of blood, occasioned by the pressure of air upon their lungs in going down to the bottom. The most robust and healthy young men are chosen for this employment; but they seldom survive it above five or six years. Their fibres become rigid; their eyeballs turn red; and they usually die consumptive.

It is amazing how very long they are seen to continue at the bottom. Some, as we are assured, have been known to continue three quarters of an hour under water without breathing; and to one unused to diving, ten minutes would suffocate the strongest. They fish for pearls, or rather the oysters that contain them, in boats twenty-eight feet long; and of these there are sometimes three or four hundred at a time, with each seven or eight stones which serve for anchors. There are from five to eight divers belonging to each, that dive one after another. They are quite naked, except that they have a net hanging down from the neck to put their oysters in, and gloves on their hands to defend them while they pick the oysters from the holes in the rocks; for in this manner alone can they be gathered. Every diver is sunk by means of a stone, weighing fifty pounds, tied to the rope, by which he descends. He places his foot in a kind of stirrup, and laying hold of the rope with his left hand, with his right he stops his nose to keep in his breath, as upon going down he takes in a very long inspiration. They are no sooner come to the bottom, but they give the signal to those who are in the boat to draw up the stone; which done, they go to work filling their nets as fast as they can; and then giving another signal, the boats above pull up the net loaded with oysters, and shortly after the diver himself to take a new inspiration. They dive to the depth of fifteen fathoms, and seldom go deeper. They generally go every morning by break of day to this fatiguing employment, taking the land-wind to waft them out to sea, and returning with the sea-breeze at night. The owners of the boats usually hire the divers, and rest of the boat's crew, as we do our laborers, at so much a day. All the oysters are brought on shore, where they are laid in a great heap, till the pearl fishery is over, which continues during the months of November and December. When opportunity serves, they examine every oyster; and it is accidental whether the capture turns out advantageous.

THE COCKLE [1]

Of the cardium, or cockle tribe, there are more than fifty species; some or other of which are to be procured on the sandy shores of all the known seas. They are mostly found immersed a few inches deep in the sand. In size, the different species vary considerably, some being five or six inches in diameter, and others not more than half an inch. The cockle has a tolerable degree of locomotive power, in consequence of its triangular yellow foot, which is conspicuous on the shell being opened. With this foot it can also draw into threads its glutinous matter, and thus in a manner anchor itself on the spot that it has chosen for its residence. The opening of the shell is protected by a soft membrane, which wholly closes up the front, except in two places, at each of which there is a small, yellow, fringed tube. Through these tubes the animal receives and ejects the water which conveys nutriment to its body.

THE CARDIUM EDULE, OR COMMON COCKLE,

Which is the species most common in England, has a grayish shell, somewhat heart-shaped, with about twenty-eight flattish ribs, transversely striated, with recurved imbrications. It is a wholesome and pleasant food. Lobsters and crabs lie in wait for an opportunity of thrusting in a leg or a claw, when the cockle is open, in order to prey on the included animal; but it often happens that the younger ones of those crustaceous animals, not being sufficiently hard to withstand the violent snapping of the shells of the larger species when they close, are deprived of the limb.

THE PHOLAS.[2]

Of all animals of the shelly tribe, the *Pholades* are the most wonderful. These animals are found in different places; sometimes clothed in their proper shell, at the bottom of the water; sometimes concealed in lumps of marly earth; and sometimes lodged, shell and all,

[1] The genus *Cardium* is characterized by a shell equivalve, subcordiform, with protuberant beaks; valves dentated, or plicated on their internal margin; hinge with four teeth in each valve, of which the two primary ones are approximated and oblique, and two lateral distant ones.

[2] The genus *Pholas* has the shell bivalve, equivalve, transverse, gaping on each side with several accessory pieces, either on the hinge, or below it; inferior margin of the valves bent outwards; animal destitute of a tubular sheath, projecting anteriorly, two united tubes, often surrounded by a common skin, and posteriorly, a short, thick, muscular foot, flattened at its extremity.

in the body of the hardest marble. In their proper shell they assume different figures; but, in general, they somewhat resemble a muscle, except that their shell is found actually composed of five or more pieces, the smaller valves serving to close up the openings left by the irregular meeting of the two principal shells. But their penetration into rocks, and their residence there, makes up the most wonderful part of their history.

This animal, when divested of its shell, resembles a roundish soft pudding, with no instrument that seems in the least fitted for boring into stones, or even penetrating the softest substance. It is furnished with two teeth indeed; but these are placed in such a situation, as to be incapable of touching the hollow surface of its stony dwelling; it has also two covers to its shell, that open and shut at either end; but these are totally unserviceable to it as a miner. The instrument with which it performs all its operations, and buries itself in the hardest rocks, is only a broad fleshy substance, somewhat resembling a tongue, that is seen issuing from the bottom of its shell. With this soft, yielding instrument, it perforates the most solid marble; and having, while yet little and young, made its way, by a very narrow entrance into the substance of the stone, it then begins to grow bigger, and thus to enlarge its apartment.

When it has buried its body in a stone, it there continues for life at its ease; the sea-water that enters at the little aperture supplying it with luxurious plenty. When the animal has taken too great a quantity of water, it is seen to spurt it out of its hole with some violence. Upon this seemingly thin diet, it quickly grows larger, and soon finds itself under a necessity of enlarging its habitation and its shell. The motion of the pholas is slow beyond conception; its progress keeps pace with the growth of its body; and in proportion as it becomes larger, it makes its way farther into the rock. When it has got a certain way in, it then turns from its former direction, and hollows downward; till at last, when its habitation is completed, the whole apartment resembles the bowl of a tobacco pipe; the hole in the shank being that by which the animal entered.

But they are not only supplied with their rocky habitation; they have also a shell to protect them; this shell grows upon them in the body of the rock, and seems a very unnecessary addition to that defence which they have procured themselves by art. These shells take different forms, and are often composed of a different number of valves; sometimes six; sometimes but three; sometimes the shell resembles a tube with holes at either end, one for the mouth, and the other for voiding the excrements.

CLASS III.—TUNICATA.

Gelatinous, or coriaceous, biforous, bitunicated animals, isolated, in groups, or often joined together in a common mass.

The place which the animals of this class ought to occupy in the arrangement corresponding to their organization, has not been satisfactorily ascertained. Cuvier places them among his molluscous animals, in the class *Acephala*, and makes them the second order of this class, under the title of acephalous animals, without shells; while Lamarck arranges them between the *Echinodermata* and *worms*. Latreille places them after the *Entozoa*, and they form the fourth order of Blainville's class, *Acephalophora*, under the name of *Heterobranchiata*. In point of fact, there seems to be, both among the vertebral and invertebral animals, more than one series of forms and structure, which, either in the descending or ascending scale, where the most nearly-allied groups, in point of structure, are arranged in sequence, will always interfere to disturb any continuous or subordinate arrangement. The existence of these parallel groups presents formidable difficulties to the classification of animals in one unbroken series; but the establishment of closely connected groups into natural families, a plan which has been largely adopted, by the recent writers on the classification of animals, renders the arbitrary limitations of systematic writers, of objects in themselves unlimited, a matter of less consequence. We have, therefore, followed M. Cuvier in placing the class *Tunicata*, under the general head Mollusca.

The animals of the class *Tunicata* have an oblong, irregular body, as if divided interiorly into many cavities. They have no head; possess no distinct organs of sensation; and no symmetrical or similar parts in pairs. Some tubercles and threads, discovered in their body, are presumed to form the nervous system. The body is besides composed of muscular fibres, and distinct blood vessels; the alimentary tube is open at both ends, and a mass of gemmæ or ova, either solitary or together, in a common envelope, seem to form the ovaries. The respiratory organ in this class is always interior, formed of two membranous, reticular leaflets, sometimes constituting a sort of sac, sometimes forming two bands of unequal length, united by one end. None of these animals possess a retractile tube for locomotion. Their body soft, or coriaceous, is generally fixed either by itself, or in connection with others of the species, to foreign substances. No trace of sexual organs has been discovered. Many of the animals of this class, from their union in a common mass, seem at first sight to form compound animals, like the polypi; but this wide distinction is to be remarked between them and the lower families, in the zoological scale, that the aggregated Tunicata are independen and individual beings, each being provided with a mouth and an aperture for

digestion, applicable to their individual wants, and unconnected with the general nutrition of the common mass. Lamarck divides this class into two orders.

Order I. Ascidiaria.—Animals disunited, either isolated, or in groups, without internal communication, and not forming essentially a common mass.

Order II. Botryllaria.—Agglomerated animals, always united, and constituting a mass with a common covering.

CLASS IV.—CIRRIPEDA.

Soft animals, destitute of head and eyes, covered with a shell, and fixed, body inarticulated, furnished with a mantle, and tentacular, cirrous, many-jointed arms above.

The class *Cirripeda* forming the genus *Lepas*, in the system of Linnæus, was instituted by Lamarck, in 1812, and has since been adopted by Cuvier, Blainville, and other naturalists, as a distinct group of molluscous animals, intermediate between them and the articulated groups. The body in this class is always much shortened, immoveable, and inclosed in a shell, either itself fixed to an extraneous body, or elevated on a tubular and moveable peduncle, which permits some degree of motion. In the first case, the shell adheres immediately to the marine bodies, upon which it is fixed; while in the other shell, of which the valves are always distinct and moveable, and inclosing the body more or less completely, is raised on a peduncle of greater or less length. This foot-stalk or peduncle is tubular, tendinous, moveable, more or less contractile, and fixed by its base; and it does not appear that the animal has the power of changing its attachment, or shifting its place. The tunic or mantle of the *Cirripeda*, in some cases, envelopes only a portion of the body, and forms the external coat of the peduncle in those which have a foot-stalk. In others, as in the genera *Otion* and *Cineras*, the tunic envelopes all the body, leaving only an anterior opening for the arms. In none is this tunic divided into two lobes, as in the *Conchifera* and *Mollusca*.

The jaws in the Cirripeda are lateral, and along the belly are numerous filaments named cirri, disposed in pairs, and composed of a great number of small joints. These cirri forming a kind of arms or fins, vary in number; sometimes there are twenty-four, or twelve pairs on each side. They are long, slender, unequal, and ciliated, with a horny skin. The longest are found at the summit of the body, and they gradually diminish, in such a manner that the shortest are nearest the mouth. In repose, they are rolled up in a spiral form. These cirri or arms have no analogy with the tentacula

of the mollusca, and seem a species of antennæ; but as the animal has no head, M. Lamarck considers them as arms.

The heart in this class is situate towards the back, and the bronchiæ on the sides. Their nervous system forms a series of knots, or ganglions under the belly. The animals are placed in their shell in such a manner that the head is below, and the cirri towards the orifice. Between these is a long, fleshy tube, at the base of which, towards the back, is the anal opening. In the interior is the stomach, with a number of small cavities in its walls, which appear to fulfil the functions of a liver; a simple intestinal canal; a double ovary; and a double winding canal for the passage of the ova.

The shell of the Cirripeda is always multivalve, or composed of a number of separate pieces. In a great portion of the class, however, where the shell is fixed immediately to other bodies, the shell appears univalve, its portions, six in number, being generally joined together at the sides. This shell is conical or tubular, fixed by its base, truncated and open at the summit. In the opening, which is terminal, are two or four moveable valves, which the animal opens and shuts at will, and which form what is termed the *operculum*. But in that portion of the class raised on a tubular peduncle, which supports the body and shell, the shell is distinctly multivalve, and of a different character from the sessile species. In the greater number, this shell consists of five unequal pieces, which form, when the shell is shut, a cone compressed on the sides; in one genus, besides these five principal pieces, are found others much smaller, termed accessory pieces; and in others, the pieces of the shell are isolated or much separated, and do not entirely cover the body. But, however great the difference between the shells of the pedunculated and the sessile species of this class, the animals are analogous in point of structure or organization; and, the shells of both, simply attached to the body, or fixed on the summit of the peduncle, are essentially different from those of the bivalve, where the two pieces of the shell are connected by a ligament and hinge. The animals of this class are hermaphrodite, and all marine. Lamarck divides the class Cirripeda into two orders.

Order I. Pedunculata.—Body supported by a tubular moveable peduncle, of which the base is fixed upon marine bodies; mouth almost inferior.

Order II. Sessilia.—Body destitute of peduncle, and fixed by the shell upon marine bodies; mouth superior and anterior.

DIVISION III.—ARTICULATA.

The third great division of the animal kingdom consists of animals which have their body or members composed of segments or articulated rings, to the interior of which the muscles are attached. The nervous system consists of two long chords extending along the belly, and swelled out at intervals into knots or ganglia. The first of these placed upon the œsophagus, though but little larger than the others, is considered as analogous to the brain in the higher animals. The teguments of the body are sometimes hard, sometimes soft; and the trunk has often at its sides articulated members, though in some groups these are wanting. As formerly observed, it is in this division of the animal kingdom, that the transition of the circulation in closed vessels to nutrition by imbibition is observed; and the corresponding transition from respiration in circumscribed organs, to that performed by trachea, or air vessels distributed through the body. The organs of movement and sense are disposed symmetrically on the sides of a common axis. The senses of taste and sight seem most distinct; and their jaws, when they have any, is always lateral. This division of the animal kingdom contains five classes, viz:—ANNELIDES, CRUSTACEA, ARACHNIDES, MYRIAPODA, and INSECTA.

CLASS V.—ANNELIDES.

Body soft, more or less elongated, naked or inclosed in a tube, and divided into a number of segments; blood red.

The animals of this class are the only invertebral ones which have red blood, circulating in a double system of complicated vessels. Their body is naked or inclosed in a tube, formed of segments, or transversely wrinkled, and often without a head, eyes, or antennæ. They are destitute of articulated feet; but the greater portion have in their place, setiferous, retractile papillæ disposed in lateral rows. The mouth is nearly terminal simple, orbicular, or labiated, or in the form of a maxillary proboscis. The anatomical structure of the animals of this class has been investigated by Cuvier, Montegre, Spix, and Savigny; and the result of their observations has led to their arrangement in a separate group. The animals of this group, it may be remarked, formed part of the class *Vermes*, of Linnæus.

The head of these species which are provided with one, is a slight anterior thickening, distinct from the first segments of the body, and upon which are the antennæ and eyes. The antennæ are articulated filaments, sometimes short and thick, inserted on the head, and of which the number exceeds five. The eyes, to the number of two or four, are also upon the head, behind the

antennæ, and between them and the first segment of the body. The tentacula are either inarticulated filaments on the head or anterior part of the body, or papillæ more or less elongated into filaments at the orifice of the mouth. The proboscis is fleshy and contractile, composed sometimes of one, and sometimes of two rings, inclosing the jaws; and the jaws are bony or calcareous, inclosed in the proboscis, in number at least two, and sometimes to the number of seven or nine. When this is the case, they are in two rows, one above the other. The body of the Annelides is in some naked, or without hairs or bristles; in others, furnished with bristles without papillæ, or with rows of setiferous papillæ. The bristles which are found without papillæ, are not retractile, while the setiferous mamillæ are generally so. These papillæ, or mamillæ, are fleshy sheaths, which inclose each a bundle of subulate bristles. The setæ traverse the papillæ, and are attached to the muscles under the skin. M. Savigny gives the name of foot to each pair of setiferous papilla, and he divides each foot into two branches, one superior or dorsal, and one inferior or ventral. The ventral branch is the most projecting, and they are best organized for progressive motion. At each branch are observed tubular, subarticulated, generally contractile cirri, analogous to antennæ. These are the antennæ of the body. Those of the dorsal branches are generally longest. The bristles of each branch, or the subulate bristles, are hard, stiff, opaque, and shine with metallic lustre. They form at each branch a moveable tuft, which the animal has the power of erecting or withdrawing at will. Besides, the subulate bristles are distinguished from others, which are thicker, straight, conical, and very sharp, inclosed in a particular sheath, and generally one in each branch, those of the ventral branches being commonly the strongest. In some genera, however, these acicular bristles are wanting. Some of the Annelides possess a third kind of bristles, which M. Savigny terms hooked bristles. These are flattened and armed below with sharp hooks. They are also retractile, and concealed in the thickness of the skin in repose. The *tentacular cirri* are those of the first pair of feet, and often those of the two or three following pairs, which are sometimes destitute of bristles, and have only cirri. In this case, the cirri acquire a greater developement, and take the appearance of tentacula. The last pair of feet constitute, by an analogous transformation, the two filaments which terminate the body posteriorly, in certain species. The first segment of the body, either alone or united to some of the following ones, often forms a ring larger than the others, more apparent than the head; and in the last segment is a plicated, anal aperture, turned upwards. All the Annelides respire by bronchiæ, and live in water, mud, sand, or moist earth. These bronchiæ vary much in situation, size, and form. In some, they are distributed along the body, partially or wholly, and in others, they are found at one extremity, chiefly the anterior. The intestine is straight, generally contracted into rings, and the anus terminal. The organs of circulation consist of lateral, dorsal, and central vessels, extending the length of the

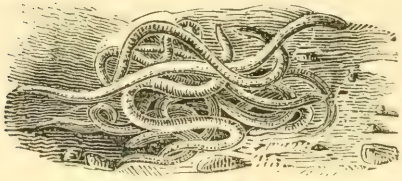
body. What are termed eyes in some species, are but ocular points, which are not conceived to give the faculty of sight. The Annelides are either naked, or construct tubes or sheaths for themselves, more or less solid, in which they remain without attachment. These tubes, or sheaths, are in some, membranous or horny, incrusted exteriorly with grains of sand, or fragments of shell, in others solid, calcareous, and homogenous. The greater part of the Annelides are carnivorous, sucking the blood of other animals. They are hermaphrodite, but require mutual impregnation. Cuvier divides the class of Annelides into three orders:—1. Tubicolæ, those in which the bronchiæ are in the form of tufts, attached to the head or anterior part of the body, and generally inhabiting tubes. 2. Dorsibranchiæ, where the bronchiæ are toward the middle of the body, or along the sides. 3. Abranchiæ, where the bronchiæ are not apparent externally. Lamarck, on the other hand divides the class into three orders, from other considerations, viz.:

Order I. Sedentariæ.—Destitute of antennæ, eyes, and jaws, and inhabiting tubes.

Order II. Antennatæ.—Head with antennæ and eyes, and a protractile proboscis often armed with jaws.

Order III. Apodes.—Destitute of feet or setiferous papillæ, and antennated head.

THE EARTH WORM[1]



Has a power of contracting or lengthening itself at will. There is a spiral muscle, that runs round its whole body, from the head to the tail, somewhat resembling a wire wound round a walking-cane, which, when slipped off, and one end extended and held fast, will bring the other nearer to it; in this manner the earth worm, having shot out or extended its body, takes hold by the slime of the fore part of its body, and so contracts and brings

[1] *Lumbricus terrestris*, Lin. The order *Apodes* to which the earth worm belongs, are destitute of feet, without setiferous and retractile papillæ; bronchiæ, when known, disposed interiorly along the body; no antenniferous head.

forward the hinder part; in this manner it moves onward, not without great effort; but the occasions for its progresssive motion are few.

As it is designed for living under the earth, and leading a life of obscurity, so it seems tolerably adapted to its situation. Its body is armed with small, stiff, sharp burrs or prickles, which it can erect or depress at pleasure; under the skin there lies a slimy juice, to be ejected as occasion requires at certain perforations, between the rings of the muscles, to lubricate its body, and facilitate its passage into the earth. Like most other insects, it has breathing holes along the back, adjoining each ring; but it is without bones, without eyes, without ears, and, properly, without feet. It has a mouth, and also an alimentary canal, which runs along to the very point of the tail. In some worms, however, particularly such as are found in the bodies of animals, this canal opens towards the middle of the belly, at some distance from the tail. The intestines of the earth worm are always found filled with a very fine earth, which seems to be the only nourishment these animals are capable of receiving.

The animal is entirely without brain; but near the head is placed the heart, which is seen to beat with a very distinct motion, and round it are the spermatic vessels, forming a number of little globules, containing a milky fluid, which have an opening into the belly, not far from the head; they are also often found to contain a number of eggs, which are laid in the earth, and are hatched in twelve or fourteen days into life, by the genial warmth of their situation.

When the eggs are laid in the earth, which, in about fourteen days, as has been said, are hatched into maturity, the young ones come forth very small, but perfectly formed, and suffer no change during their existence: how long their life continues is not well known, but it certainly holds for more than two or three seasons. During the winter, they bury themselves deeper in the earth, and seem, in some measure, to share the general torpidity of the insect tribe. In spring, they revive with the rest of nature, and on those occasions a moist or dewy evening brings them forth from their retreats, for the universal purpose of continuing their kind. They chiefly live in a light, rich, and fertile soil, moistened by dews or accidental showers, but avoid those places where the water is apt to lie on the surface of the earth, or where the clay is too stiff for their easy progression under ground.

THE LEECH,

From its uses in medicine, is one of those insects that man has taken care to propagate, but, of a great variety, one kind only is considered as service-

able. The horse leech,[1] which is the largest of all, and grows to four inches in length, with a glossy black surface, is of no use, as it will not stick to the skin; the snail leech is but an inch in length; and though it will stick, is not large enough to extract a sufficient quantity of blood from the patient; the broad-tailed leech, which grows to an inch and a half in length, with the back raised into a sort of a ridge, will stick but on very few occasions; it is the large brown leech[2] with a whitish belly, that is made use of in medicine, and whose history best merits our curiosity.

The leech has the general figure of a worm, and is about as long as one's middle finger. Its skin is composed of rings, by means of which it is possessed of its agility, and swims in water. It contracts itself when out of water, in such a manner that, when touched, it is not above an inch long. It has a small head, and a black skin, edged with a yellow line on each side, with some yellowish spots on the back. The belly also, which is of a reddish color, is marked with whitish yellow spots. But the most remarkable part of this animal is the mouth, which is composed of two lips, that take whatever form the insect finds convenient. When at rest, the opening is usually triangular; and within it are placed three very sharp teeth, capable of piercing not only the human skin, but also that of a horse or an ox. Still deeper in the head is discovered the tongue, which is composed of a strong fleshy substance, and which serves to assist the animal in sucking, when it has inflicted its triple wound; for no sooner is this voracious creature applied to the skin, than it buries its teeth therein, then closes its lips round the wound which it has made; and thus, in the manner of a cupping-glass, extracts the blood as it flows to the different orifices.

The leech is viviparous, and produces its young one after the other, to the number of forty or fifty at a birth. It is probable that, like the snail, each insect contains the two sexes, and that it impregnates, and is impregnated, in the same manner. The young ones are chiefly found, in the month of July, in shallow running waters, and particularly where they are tepified by the rays of the sun. The large ones are chiefly sought after; and, being put into a glass vessel filled with water, they remain for months, nay, for years, without taking any other subsistence. But they never breed in this confinement; and, consequently, what regards that part of their history still remains obscure.

In England, they seldom grow to above four inches; but in the East, they are found from six to seven. Their pools abound with them in such numbers, that it would be dangerous bathing there, if from no other consi-

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[1] *Hirudo sanguisuga*, Lin. The genus *Hirudo* has the body oblong, blunt, slightly depressed, widened posteriorly, composed of numerous contractile segments, and with the posterior extremity terminated by a broad prehensile disc; mouth naked, dilatable armed interiorly with three teeth or horny jaws; no eyes; anus superior, near the posterior disc.

[2] *Hirudo medicinalis*, Lin.

deration. The English sailors and soldiers, who were obliged to walk in those countries through marshy grounds, talked with terror of the number of leeches that infested them on their march. Even in some parts of Europe, they increase so as to become formidable. Sedelius, a German physician, relates, that a girl of nine years old, who was keeping sheep near the city of Bomst, in Poland, perceiving a soldier making up to her, went to hide herself in a neighboring marsh, among some bushes; but the number of leeches was so great in that place, and they stuck to her so close, that the poor creature expired from the quantity of blood which she lost by their united efforts. Nor is this much to be wondered at, since one of these insects, of a large size, will draw about an ounce of blood.

CLASS VI.—CRUSTACEA.

Invertebral animals, with a crustaceous, and more or less horny covering, provided with articulated members, distinct organs of circulation, and respiring by bronchiæ.

The animals of this class were known to the Greeks under the name of μαλακοστρακος, as designating marine animals, of which the exterior envelope was much less solid than that of the testaceous, and much more so than the covering of the native Mollusca. Among the Romans, this designation was signified by the terms of *Crustata* and *Crustacea*, the last of which forms the present name for the class. The earliest modern naturalists, like the more ancient writers, arranged the Crustacea between the fishes and the mollusca; and Linnæus placed them in his class *Insecta*, along with the apterous insects, including the spiders in the same class. Brisson was the first who formed them into a separate group.

The Crustacea in one view ought certainly to occupy a more elevated place among the invertebral animals, than has been assigned to them,—above those, for instance, which are destitute of articulated members and eyes, and where the sexual organs are in the same individual; but, on the other hand, to place them between the Cephalopodous and Gasteropodous Mollusca, which would seem to be their place in the series, would break the chain of connection which unites this great class. It became necessary, therefore, either to place the Crustacea before molluscous animals, or after them, and this last alternative has been adopted by modern zoologists. The Crustacea, besides the characters they have in common with the two following classes, possess some peculiar to themselves. They respire by bronchiæ, or by bronchial laminæ generally annexed to their feet, or to their jaws. They have a distinct heart, provided with circulating vessels; feet to the

number of five or seven pairs; a head, sometimes not distinct from the trunk, with two or four antennæ, and two moveable, compound, and often pedunculated eyes. The organs of generation are at the base of the feet, or at the extremity of the body. The Crustacea are, in general, to be recognised from their solid envelope, which is sometimes extremely hard, as when the calcareous matter of the covering predominates over the membranous portion; but, according to the families and genera, the calcareous portion diminishes in quantity, and the corneous material becomes predominant, till at last the covering seems simply membranous.

The antennæ in this class are jointed, setaceous, and generally four in number. In some, the head is intimately united to the thorax, or is indistinguishable as a separate organ. The shield in this case forms a large covering over the thorax, which is called the *shell*. In others, where the head is distinct, the body is divided into seven segments, to which the feet are attached below. The body is often terminated posteriorly by a tail composed of many segments. The feet, in general, are from ten to fourteen, and with six articulations, the two natural feet, and sometimes the two or four following ones, being terminated in a kind of forceps; at other times, in simple hooks; and in some, the termination of the feet seems adapted only for swimming.

The Crustacea have two *eyes*, in some species elevated on moveable peduncles, in others sessile. These eyes are, in general, compound or reticulated; but in some, both eyes are united into one. The *mouth* is provided, in general, with two mandibles, a *labium* below, and from three to five pairs of jaws. To the first pair, or the first three pairs of these, the name of the feet-jaws has been applied, as being formed by the two or six anterior feet of the animal, modified by their position near the mouth, and not proper for locomotion. The branchiæ are exterior in the Crustacea, although often concealed, and placed at the sides, feet, or under the tail. They are, however, generally at the base of one part of the feet, and are composed of pyramidal laminæ, or tufted filaments.

The nervous system in this class is very similar to that of the arachnides and insects. It consists principally of a ganglion or brain, placed before and above the intestinal canal, and of an elongated double chord, with ganglions or knots, placed on the lower surface of the body, sometimes extending its whole length, at others forming towards the middle, a medullary circle, with radiated elongations. The Crustacea enjoy the faculty of sight; many of them, that of hearing; and they possess the senses of smell and taste; but their sense of touch is obscure, from their calcareous or horny covering.

The class Crustacea is divided by Latreille into five orders, founded upon the difference in structure and form of the branchiæ, the manner in which the head is connected with the trunk and the organs of mastication. The first three were included by Linnæus in his genus *Cancer*; the fourth formed the genus *Oniscus*, of that author.

Order I. Decapoda.—With palpi at the mandibles, moveable eyes, and the head not distinct from the trunk; bronchiæ pyramidal, in leaflets or plumes, placed at the exterior base of the feet-jaws, and the feet properly so called, and concealed under the lateral margins of the shell.

Order II. Stomapoda.—With palpi at the mandibles, and moveable eyes, but the head distinct from the trunk, and divided into two portions, of which the anterior bears the antennæ and eyes; bronchiæ plumose, suspended under the tail.

Order III. Amphipoda.—Palpi at the mandibles, and eyes immoveable, head distinct from the trunk, and in one piece; bronchiæ vesicular, and placed at the interior base of the feet, with the exception of the anterior pair.

Order IV. Isopoda.—Mandibles without palpi, and the mouth always composed of many jaws, of which the two under ones resemble a lip with two palpi; bronchiæ generally under the abdomen; feet simple, and only proper for locomotion or prehension; head for the most part distinct; no shell; and the eyes granulated.

Order V. Branchiopoda.—Mouth in the form of a beak, sometimes composed of many jaws; feet in the form of fins, and the bronchiæ attached between them. Body generally covered with a shell, not distinct from the head.

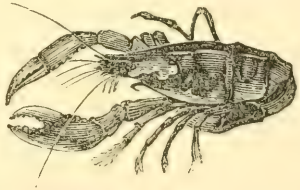
The Crustacea are generally carnivorous, feeding on dead, or decomposed animal matters. Some are constantly fixed on cetaceous animals, aquatic reptiles, and fishes. The greater portion live in the sea, at different depths, and in localities proper to their various habits; others are found in fresh water, or on land. These which have fin-like feet, swim on their side or back, and the greater part of the others walk sideways or backwards. Some run with extreme rapidity, and others are constructed for climbing trees. Many species afford an agreeable food, and are taken for this purpose, in numbers, or for bait. The members of the Crustacea, when injured or disabled, are speedily reproduced, and they change their crustaceous covering annually.

THE LOBSTER.[1]

The lobster is an animal of so extraordinary a form, that those who first see it are apt to mistake the head for the tail; but it is soon discovered that

[1] *Astacus marinus*, Lin. The genus *Astacus* has four unequal antennæ, in the same transverse line, the two intermediate shortest, and deeply bifid, the lateral ones simple, and longer than the body, and the peduncle with squamiform teeth; exterior feet-jaws long, the two first joint furnished with stiff hairs, and small spines on the internal side; body oblong, subcylindrical, and the shell with a projecting beak; tail terminated by a fan-shaped fin; the lateral pieces divided in two; six anterior legs didactyle, the first pair very long and thick, with the head more or less tuberculous, and spinous.

the animal moves with its claws foremost; and that the part which plays within itself by joints, like a coat of armor, is the tail. The mouth, like that of insects, opens the long way of the body, not crosswise, as with man, and the higher race of animals. It is furnished with two teeth in the mouth, for the comminution of its food; but as these are not sufficient, it has three more in the stomach; one on each side, and the other below. Between the two teeth there is a fleshy substance, in the shape of a tongue. The intestines consist of one long bowel, which reaches from the mouth to the vent; but what this animal differs in from all others is, that the spinal marrow is in the breast bone. It is furnished with two long feelers or horns, that issue on each side of the head, that seem to correct the dimness of the sight, and apprize the animal of its danger, or of its prey. The tail, or that jointed instrument at the other end, is the grand instrument of motion; and with this it can raise itself in the water. Under this, we usually see lodged the spawn in great abundance; every pea adhering to the next by a very fine filament, which is scarcely perceivable. Every lobster is an hermaphrodite, and is supposed to be self-impregnated. The ovary, or place where the spawn is first produced, is backwards, towards the tail, where a red substance is always found, and which is nothing but a cluster of peas, that are yet too small for exclusion. From this receptacle there go two



canals, that open on each side at the jointures of the shell, at the belly; and through these passages the peas descend to be excluded, and placed under the tail, where the animal preserves them from danger for some time, until they come to maturity. They are then dropped in the sand, where they are soon hatched. Between twelve and thirteen thousand eggs have been counted in one lobster.

When the young lobsters are produced, they immediately seek for refuge in the smallest clefts of rocks, and in such like crevices at the bottom of the sea, where the entrance is but small, and the opening can be easily defended. There, without seeming to take any food, they grow larger in a few weeks' time, from the mere accidental substances which the water washes to their retreats. By this time, also, they acquire a hard, firm shell, which furnishes them with both offensive and defensive armor. They then begin to issue from their fortresses, and boldly creep along the bottom, in hopes of

meeting with diminutive plunder. The spawn of fish, the smaller animals of their own kind, but chiefly the worms that keep at the bottom of the sea, supply them with plenty. They keep in this manner close among the rocks, busily employed in scratching up the sand with their claws for worms, or surprising such heedless animals as fall within their grasp; thus they have little to apprehend, except from each other; for in them, as among fishes, the large are the most formidable of all enemies to the small.

But this life of abundance and security is soon to have a most dangerous interruption; for the body of the lobster still continuing to increase, while its shell remains unalterably the same, the animal becomes too large for its habitation, and imprisoned within the crust that has naturally gathered round it, there comes on a necessity of getting free. The young of this kind, therefore, that grow faster, as we are assured by the fishermen, change their shell oftener than the old, who come to their full growth, and who remain in the same shell often for two years together. In general, however, all these animals change their shell once a year; and this is not only a most painful operation, but also subjects them to every danger. Just before casting its shell, it throws itself upon its back, strikes its claws upon each other, and every limb seems to tremble; its feelers are agitated, and the whole body is in violent motion; it then swells itself in an unusual manner, and at last the shell is seen beginning to divide at its junctures. It also seems turned inside out; and its stomach comes away with its shell. After this, by the same operation, it disengages itself of the claws, which burst at the joints; the animal, with a tremulous motion, casting them off as a man would kick off a boot that was too big for him.

Thus, in a short time, this wonderful creature finds itself at liberty; but in such a weak and enfeebled state, that it continues for several hours motionless. Indeed, so violent and painful is the operation, that many of them die under it; and those which survive are in such a weakly state for some time, that they neither take food nor venture from their retreats. Immediately after this change, they have not only the softness, but the timidity of a worm. Every animal of the deep is then a powerful enemy, which they can neither escape nor oppose; and this, in fact, is the time when the dog-fish, the cod, and the ray, devour them by hundreds. But this state of defenceless imbecility continues for a very short time; the animal, in less than two days, is seen to have the skin that covered its body, grown almost as hard as before; its appetite is seen to increase; and, strange to behold! the first object that tempts its gluttony, is its own stomach, which it so lately was disengaged from. This it devours with great eagerness; and, some time after, eats even its former shell. In about forty-eight hours, in proportion to the animal's health and strength, the new shell is perfectly formed, and as hard as that which was but just thrown aside.

When the lobster is completely equipped in its new shell, it then appears how much it has grown in the space of a very few days; the dimensions

of the old shell being compared with those of the new, it will be found that the creature is increased above a third in its size; and, like a boy that has outgrown his clothes, it seems wonderful how the deserted shell was able to contain so great an animal as entirely fills up the new.

The creature thus furnished, not only with a complete covering, but also a greater share of strength and courage, ventures more boldly among the animals at the bottom; and not a week passes that in its combats it does not suffer some mutilation. A joint, or even a whole claw, is sometimes snapped off in these encounters. At certain seasons of the year, these animals never meet each other without an engagement. In these, to come off with the loss of a leg, or even a claw, is considered as no great calamity; the victor carries off the spoil to feast upon at his leisure, while the other retires from the defeat to wait for a thorough repair. This repair it is not long in procuring. From the place where the joint of the claw was cut away, is seen in a most surprising manner to bourgeon out the beginning of a new claw. This, if observed, at first, is small and tender, but grows in the space of three weeks, to be almost as large and as powerful as the old one. We say almost as large, for it never arrives to the full size; and this is the reason we generally find the claws of lobsters of unequal magnitude.

Of this extraordinary, yet well-known animal, there are many varieties, with some differences in the claws, but little in the habits or conformation. It is found above three feet long; and, if we may admit the shrimp and the prawn into the class, though unfurnished with claws, it is seen not above an inch. These all live in the water, and can bear its absence but for a few hours. The shell is black when taken out of the water, but turns red by boiling. The most common way of taking the lobster is in a basket, or pot, as the fishermen call it, made of wicker work, in which they put the bait, and then throw it to the bottom of the sea, in six or ten fathom water. The lobsters creep into this for the sake of the bait, but are not able to get out again.

THE CRAB.[1]

As the crab is found upon land as well as in the water, the peculiarity of its situation produces a difference in its habitudes, which it is proper to describe.

THE COMMON, OR BLACK-CLAWED CRAB,

Has three notches on the front; five serrated teeth on each side; the claws elevated; the next joint toothed; the hind feet subulated; the color a dirty green, but red when boiled. It inhabits almost all shores, and lurks and burrows under the sand.

It changes its shell once a year, generally between Christmas and Easter, and while it is performing this operation, it retires among the cavities of rocks, and under large stones. The crab is an exceedingly quarrelsome animal, and when it has seized on its antagonist, it is not easily compelled to forego its hold. In this situation, the captive has no resource but to relinquish the limb, and nature has provided it with the power of accomplishing this in a very curious manner. It stretches the claw out steady, the claw suddenly gives a gentle crack, and the wounded limb drops off, not, as we might be led to infer from reasoning, at the joint, but in the smoothest part.

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[1] *Cancer pagurus*, Lin. The genus *Cancer*, or crabs, have the exterior antennæ short, inverted between the inner canthus of the eye and front, and the intermediate ones, in small furrows in the centre; third joint of the anterior feet-jaws, almost square, with a notch at the internal angle of the summit; anterior feet largest, with the forceps unequal; shell short, transverse, narrowed posteriorly; the anterior margin semicircular, often dentated on the sides, with the lateral angle obtuse; eyes on a short peduncle.

THE LAND CRAB

Is found in some of the warmer regions of Europe, and in great abundance in all the tropical climates in Africa and America. They are of various kinds, and endued with various properties; some being healthful, delicious, and nourishing food; others poisonous or malignant to the last degree; some are not above half an inch broad, others are found a foot over; some are of a dirty brown, and others beautifully mottled

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THE VIOLET CRAB,

Of the Caribee Islands, is the most noted, both for its shape, the delicacy of its flesh, and the singularity of its manners. It somewhat resembles two hands cut through the middle and joined together; for each side looks like four fingers, and the two nippers or claws resemble the thumbs. All the rest of the body is covered with a shell as large as a man's hand, and bunched in the middle, on the fore part of which there are two long eyes of the size of a grain of barley, as transparent as crystal, and as hard as horn. A little below these is the mouth, covered with a sort of barbs, under which there are two broad, sharp teeth, as white as snow. They are not placed, as in other animals, crosswise, but in the opposite direction, not much unlike the blade of a pair of scissors. With these teeth they can easily cut leaves, fruits, and rotten wood, which is their usual food. But their principal instrument for cutting and seizing their food is their nippers, which catch such a hold, that the animal loses the limb sooner than its grasp, and is often seen scampering off, having left its claw still holding fast upon the enemy. The faithful claw seems to perform its duty, and keeps for above a minute fastened upon the finger, while the crab is making off. In fact, it loses no great matter by leaving a leg or an arm, for they soon grow again, and the animal is found as perfect as before.

This, however, is the least surprising part of this creature's history; and what we are going to relate, were it not as well known and as confidently confirmed as any other circumstance in natural history, might well stagger our belief. These animals live not only in a kind of society in their retreats in the mountains, but regularly once a year march down to the seaside in a body of some millions at a time. As they multiply in great numbers, they choose the months of April or May, to begin their expedition; and then sally out by thousands from the stumps of hollow trees, from the clifts of rocks and from the holes which they dig for themselves under the surface of the earth. At that time, the whole ground is covered with this band of adventurers; there is no setting down one's foot without treading upon them.

The sea is the place of destination, and to that they direct their march, with right-lined precision. No geometrician could send them to their destination by a shorter course; they neither turn to the right nor left, whatever obstacles intervene; and even if they meet with a house, they will attempt to scale the walls to keep the unbroken tenor of their way. But though this be the general order of their route, they upon other occasions are compelled to conform to the face of the country; and if it be intersected by rivers, they are then seen to wind along the course of the stream. The procession sets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which the first consists of the strongest and boldest males, that, like pioneers, march forward to clear the route and face the greatest dangers. These are often obliged to halt for want of rain, and go into the most convenient encampment till the weather changes. The main body of the army is composed of females, which never leave the mountains till the rain is set in for some time, and then descend in regular battalia, being formed into columns of fifty paces broad, and three miles deep, and so close that they almost cover the ground. Three or four days after this, the rear-guard follows; a straggling, undisciplined tribe, consisting of males and females, but neither so robust nor so numerous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occasion; and they continue to move forward in their slow, uniform manner. When the sun shines, and is hot upon the surface of the ground, they then make a universal halt, and wait till the cool of the evening. When they are terrified, they march back in a confused, disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the skin, and then leave the weapon where they inflicted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten those that come to disturb them. But though they thus strive to be formidable to man, they are much more so to each other; for they are possessed of one most unsocial property, which is, that if any of them by accident is maimed in such a manner as to be incapable of proceeding, the rest fall upon and devour it on the spot, and then pursue their journey.

When, after a fatiguing march, and escaping a thousand dangers, for they are sometimes three months in getting to the shore, they have arrived at their destined port, they prepare to cast their spawn. The peas are yet within their bodies, and not excluded, as is usual in animals of this kind, under the tail; for the creature waits for the benefit of the sea water to help the delivery. For this purpose, the crab has no sooner reached the shore than it eagerly goes to the edge of the water, and lets the waves wash over its body two or three times. This seems only a preparation for bringing their spawn to maturity; for without farther delay they withdraw to seek a lodging upon land; in the mean time, the spawn grows larger, is excluded

out of the body, and sticks to the barbs under the flab, or more properly the tail. This bunch is seen as big as a hen's egg, and exactly resembling the roes of herrings. In this state of pregnancy, they once more seek the shore for the last time, and shaking off their spawn into the water, leave accident to bring it to maturity. At this time, whole shoals of hungry fish are at the shore, and about two thirds of the crabs' eggs are immediately devoured by these rapacious invaders. The eggs that escape are hatched under the sand; and soon after, millions at a time of these little crabs are seen quitting the shore, and slowly travelling up to the mountains.

The old ones, however, are not so active to return; they have become so feeble and lean, that they can hardly creep along, and the flesh at that time changes its color. Most of them, therefore, are obliged to continue in the flat parts of the country till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt, so that no air may enter. There they throw off their old shells, which they leave as it were quite whole, the place where they are opened on the belly being unseen. At that time they are quite naked, and almost without motion for six days together, when they become so fat as to be delicious food. They have then under their stomachs four large white stones, which gradually decrease in proportion as the shell hardens, and when they come to perfection are not to be found. It is at that time that the animal is seen slowly making its way back; and all this is most commonly performed in the space of six weeks.

The descent of these creatures for such important purposes, deserves our admiration; but there is an animal of the lobster kind that annually descends from its mountains in like manner, and for purposes still more important and various. Its descent is not only to produce an offspring, but to provide itself a covering; not only to secure a family, but to furnish a house. The animal in question is the Soldier Crab, or Hermit Crab,[1] which

has some similitude to the lobster, if divested of its shell. It is usually about four inches long, has no shell behind, but is covered down to the tail with a rough skin, terminating in a point. It is, however, armed with strong, hard nippers before, like the lobster; and one of them is as thick as

[1] *Pagurus Bernhardus.* LIN.

a man's thumb, and pinches most powerfully. It is, as was said, without a shell to any part except its nippers; but what nature has denied to this animal, it takes care to supply by art; and taking possession of the deserted shell of some other animal, it resides in it, till, by growing too large for its habitation, it is under a necessity of change. It is a native of the West India Islands; and like the former, it is seen every year descending from the mountains to the seashore, to deposit its spawn, and to provide itself with a new shell. This is a most bustling time with it, having so many things to do; and, in fact, very busy it appears. It is very probable that its first care is to provide for its offspring before it attends to its own wants; and it is thought, from the number of little shells which it is seen examining, that it deposits its spawn in them, which thus is placed in perfect security till the time of exclusion.

It is very diverting to observe these animals when changing the shell. The little soldier is seen busily parading the shore along that line of pebbles and shells which is formed by the extremest wave, still, however, dragging its old incommodious habitation at its tail, unwilling to part with one shell, even though a troublesome appendage, till it can find one more convenient. It is seen stopping at one shell, turning it and passing it by; going on to another, contemplating that for a while, and then slipping its tail from its old habitation to try on the new: this also is found to be inconvenient, and it quickly returns to its old shell again. In this manner, it frequently changes, till at last it finds one light, roomy, and commodious; to this it adheres, though the shell be sometimes so large as to hide the body of the animal, claws and all.

Yet it is not only after many trials, but many combats also, that the soldier is completely equipped; for there is often a contest between two of them for some well-looking, favorite shell for which they are rivals. They both endeavor to take possession; they strike with their claws; they bite each other, till the weakest is obliged to yield, by giving up the object of dispute. It is then that the victor immediately takes possession, and parades in his new conquest three or four times backward and forward upon the strand before his envious antagonist.

When this animal is taken, it sends forth a feeble cry, endeavoring to seize the enemy with its nippers; which, if it fastens upon, it will sooner die than quit the grasp. The wound is very painful, and not easily cured. For this reason, and as it is not much esteemed for its flesh, it is generally permitted to return to its old retreat to the mountains in safety. There it continues till the necessity of changing once more, and the desire of producing an offspring, expose it to fresh dangers the year ensuing.

THE SHRIMP.[1]

Shrimps possess long, slender feelers, and between them two thin, projecting laminæ: the claws have a single hooked, moveable fang; they have three pair of legs; seven joints in the tail; the middle caudal fin subulated, the four others round and fringed; a spine on the exterior side of each of the outmost. These animals, which are of a delicate flavor, inhabit the shores of Britain in vast quantities, ascend the rivers, and even find their way into the ditches and ponds of salt marshes. Those caught in the sea are, however much better than those of the rivers. They are also found in the United States.

THE PRAWN.[2]

The prawn is not unlike the shrimp, but exceeds it in size, being at least three times as big; and is more pleasing in color, it having, when boiled, the most beautiful pink tint all over its body. The flesh is better tasted than that of the shrimp. It has a long horn in front of its head, compressed vertically, which bends somewhat upward, and is serrated both above and below. Seaweeds, and the vicinity of rocks near the shore, are the haunts of the prawn, which, unlike the shrimp, seldom enters the mouths of rivers. It usually swims on its back, but when in danger it throws itself on one side, and springs backward to a considerable distance.

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[1] The genus *Crangon*, or shrimp, has the anterior part of the legs largest, with a compressed monodacty, hand; the second and third parts more slender; the fourth and fifth thicker; exterior antennæ setaceous, the length of the body; the intermediate divided into two filaments; shell thin, semi-transparent, with a short rostrum before.

[2] *Palæmon serratus*, Leach.

CLASS VII.—ARACHNIDES.

Oviparous animals with articulated members, and not undergoing a metamorphosis; respiration tracheal or branchial, the openings for the admission of the air stigmatiform; no antennæ.

The animals of this class were arranged by Linnæus in the last order of his class *Insecta*, but were formed into a separate class by Lamarck, in 1800, under *Arachnides*, from αραχνης, a spider, as denoting animals which cannot properly be included either among the Crustacea or insects. They differ from the Crustacea in having their respiratory organs always in the interior of the body; and from the insects, in not undergoing a metamorphosis.

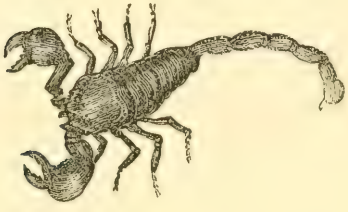
The head in the Arachnides is not distinct from the trunk; the eyes are simple, and vary in number from two to eight. Some have two jointed mandibles or forceps at the posterior extremity of the trunk, such as the scorpions; in others, these parts take the form of the sucker. The Arachnides are also destitute of a labium, or under lip, as in the insects; the part designed under this name being a dilatation of the space between the fore feet, which sometimes forms part of the sucker. The mouth is generally accompanied by two palpi. The number of feet in the animals of this class is eight; although some have six, and the females of others have two additional ones for the purpose of carrying their ova. These feet are arranged around the sides of the breast, and are composed of seven joints; the first two forming the haunch, the third corresponding to the thigh; the two next to the leg, and the last two to the tarsi. The feet are terminated by two hooks, generally dentated or pectinated below; and a smaller simple one in the middle. The trunk of the body, except in one family, is soft, and without apparent divisions; the envelope being a kind of bag or sack, including the organs of circulation, respiration, and intestines, and the secreting vessels of the matters which forms their web. The heart is a large vessel running along the back, with branches on each side. The respiratory organs, two in number, and composed of minute laminæ, are contained in the interior walls of two sacks, situated at the lower part of the belly, one on each side, and covered by a membranous operculum. A transverse cleft affords a passage for the external air, and two yellowish or whitish spots generally indicate the place of these organs. The intestinal canal is short, with two dilatations, the last surrounded by the liver. The vessels containing the matter of the web, generally six in number, extend on each side internally, are of a tortuous form, narrowed abruptly towards their extremity, and terminate in a straight filament ending at the membranous papillæ from which the threads are exuded. The generative organs of both sexes are placed at the base of the belly, and are double in all the pulmonary Arachnides. Some of the Arachnides live on land; others in the water; and a third group are parasitical

on different animals. In general, they are carnivorous, and suck the blood of their prey or animals. A small number only feed on vegetable matters Many have mandibles which exercise the office of a sucker; and others have an isolated sucker, often, however, joined with mandibles and palpi. The terrestrial species are in general solitary animals, and of a forbidding aspect, and many of them shun the light, and live in concealment. Several of these are poisonous, and their bite dangerous. Lamarck divides the class of Arachnides into three orders, viz: First, Those destitute of antennæ, furnished with branchial sacs for respiration, and with six to eight eyes. Second, Those destitute of antennæ, with branched trachea for respiration, and with two or four smooth eyes. Third, Those with antennæ and gangliated trachia for respiration; while Latreille arranges the class into two orders, according to the characters of their branchial apparatus.

Order I. PULMONARIÆ.—With pulmonary sacs for respiration; a heart and distinct vessels.

Order II. TRACHEARIÆ.—Respiring by tracheæ, and the organs of circulation indistinct.

THE SCORPION.[1]



There are four principal parts distinguishable in this animal; the head, the breast, the belly, and the tail. The scorpion's head seems, as it were, joined to the breast; in the middle of which are seen two eyes; and a little more forward, two eyes more, placed in the fore part of the head; these eyes are so small, that they are scarcely perceivable; and it is probable the animal has but little occasion for seeing. The mouth is furnished with two jaws; the undermost is divided into two, and the parts notched into each

[1] The genus *Scorpio* has two large palpi in the form of arms, the last joint thickest, and in the form of forceps; mandibles short, narrow, and didactyle; jaws short, rounded; eyes six or eight; body oblong, divided into many segments, with a long, knotty, tail terminated in an arched sting; two pectinated and moveable plates under the belly at the base of the abdomen; four spiracles on each side; eight feet.

other, which serves the animal as teeth, and with which it breaks its food, and thrusts it into its mouth; these the scorpion can at pleasure pull back into its mouth, so that no part of them can be seen. On each side of the head are two arms, each composed of four joints; the last of which is large, with strong muscles, and made in the manner of a lobster's claw. Below the breast are eight articulated legs, each divided into six joints; the two hindmost of which are each provided with two crooked claws, and here and there covered with hair. The belly is divided into seven little rings; from the lowest of which is appended a tail, composed of six joints, which are bristly, and formed like little globes, the last being armed with a crooked sting. This is that fatal instrument which renders the insect so formidable; it is long, pointed, hard, and hollow; it is pierced near the base by two small holes, through which, when the animal stings, it ejects a drop of poison, which is white, caustic, and fatal. The reservoir in which this poison is kept, is a small bladder near the tail, into which the venom is distilled by a peculiar apparatus. If this bladder be gently pressed, the venom will be seen issuing out through the two holes above mentioned; so that it appears, that when the animal stings, the bladder is pressed, and the venom issues through the two apertures into the wound.

There are few animals more formidable, or more truly mischievous, than the scorpion. As it takes refuge in a small place, and is generally found sheltering in houses, so it cannot be otherwise than that it must frequently sting those among whom it resides. In some of the towns of Italy, and in France, in the province of Languedoc, it is one of the greatest pests that torment mankind; but its malignity in Europe is trifling, when compared to what the natives of Africa and the East are known to experience. In Batavia, where they grow twelve inches long, there is no removing any piece of furniture, without the utmost danger of being stung by them.

Bosman assures us that, along the Gold Coast, they are often found larger than a lobster; and that their sting is inevitably fatal. In Europe, the general size of this animal does not exceed two or three inches; and its sting is very seldom found to be fatal. Maupertuis, who made several experiments on the scorpion of Languedoc, found it by no means so invariably dangerous as it had till then been represented.

From his experiments, indeed, it appears that many circumstances, which are utterly unknown, must contribute to give efficacy to the scorpion's venom; but whether its food, long fasting, the season, the nature of the vessels it wounds, or its state of maturity, contribute to or retard its malignity, is yet to be ascertained by succeeding observers.

The scorpion of the tropical climates being much larger than the former, is probably much more venomous. Helbigius, however, who resided many years in the East, assures us, that he was often stung by the scorpion, and never received any material injury from the wound; a painful tumor generally ensued; but he always cured it by rubbing the part with a piece of iron

or stone, as he had seen the Indians practise before him, until the flesh became insensible. Seba, Moore, and Bosman, however, give a very different account of the scorpion's malignity; and assert that, unless speedily relieved, the wound becomes fatal.

It is certain that no animal in the creation seems endued with such an irascible nature

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THE SPIDER[1]

Has two divisions in its body. The fore part, containing the head and breast, is separated from the hinder part or belly by a very slender thread, through which, however, there is a communication from one part to the other. The fore part is covered with a hard shell, as well as the legs, which adhere to the breast. The hinder part is clothed with a supple skin, beset all over with hair. They have several eyes all round the head, brilliant and acute; these are sometimes eight in number, sometimes but six; two behind, two before, and the rest on each side. Like all other insects, their eyes are immoveable; and they want eyelids; but this organ is fortified with a transparent horny substance, which at once secures and assists their vision. As the animal procures its subsistence by the most watchful attention, so large a number of eyes was necessary to give it the earliest information of the capture of its prey. They have two pincers on the fore part of the head, rough, with strong points, toothed like a saw, and terminating in claws like those of a cat. A little below the point of the claw there is a small hole, through which the animal emits a poison, which, though harmless to us, is sufficiently capable of instantly destroying its prey. This is the most powerful weapon they have against their enemies, they can open or extend these pincers as occasion may require; and when they are undisturbed, they suffer them to lie one upon the other, never opening them but when there is a necessity for their exertion. They have all eight legs, joined like those of lobsters, and similar also in another respect; for if a leg

[1] The order of *Araneides* or spiders has palpi in the form of small feet, terminated by a little hook, the last joint bearing the sexual organs in the male; four to six web-spinning mamillæ situate near the anus, and in both sexes.

be torn away, or a joint cut off, a new one will quickly grow in its place, and the animal will find itself fitted for combat as before. At the end of each leg there are three crooked moveable claws; namelv, a small one, placed higher up, like a cock's spur, by the assistance of which it adheres to the threads of its web. There are two others larger, which meet together like a lobster's claw, by which they can catch hold of the smallest depressions, walking up or down very polished surfaces, on which they can find inequalities that are imperceptible to our grosser sight. But when they walk upon such bodies as are perfectly smooth, as looking-glass or polished marble, they squeeze a little sponge, which grows near the extremity of their claws, and thus diffusing a glutinous substance, adhere to the surface until they make a second step. Besides the eight legs just mentioned, these animals have two others, which may more properly be called arms, as they do not serve to assist motion, but are used in holding and managing their prey.

The spider, though thus formidably equipped, would seldom prove successful in the capture, were it not equally furnished with other instruments to assist its depredations. It is a most experienced hunter, and spreads its nets to catch such animals as it is unable to pursue. The spider's web is generally laid in those places where flies are most apt to shelter. There the little animal remains for days, nay, weeks together, in patient expectation, seldom changing its situation though ever so unsuccessful.

For the purposes of making this web, nature has supplied this animal with a large quantity of glutinous matter, and five dugs or teats for spinning it into thread. This substance is contained in a little bag, and at first sight resembles soft glue; but when examined more accurately, it will be found twisted into many coils of an agate color, and upon breaking it, the contents may easily be drawn out into threads, from the tenacity of the substance, not from those threads being already formed. Those who have seen the machine by which wire is spun, will have an idea of the manner in which this animal forms the threads of its little net, the orifices of the five teats above mentioned, through which the thread is drawn, contracting or dilating at pleasure. The threads which we see, and appear so fine, are, notwithstanding, composed of five joined together, and these are many times doubled when the web is in formation.

When a house spider proposes to begin a web, it first makes choice of some commodious spot, where there is an appearance of plunder and security. The animal then distils one little drop of its glutinous liquor, which is very tenacious, and then creeping up the wall, and joining its threads as it proceeds, it darts itself in a very surprising manner to the opposite place, where the other end of the web is to be fastened. The first thread thus formed, drawn tight, and fixed at each end, the spider then runs upon it backward and forward, still assiduously employed in doubling and strengthening it, as upon its force depend the strength and stability of the whole. The

scaffolding thus completed, the spider makes a number of threads parallel to the first, in the same manner, and then crosses them with others; the clammy substance of which they are formed serving to bind them, when newly made, to each other.

The insect, after this operation, doubles and trebles the thread that borders its web, by opening all its teats at once, and secures the edges, so as to prevent the wind from blowing the work away. The edges being thus fortified, the retreat is next to be attended to; and this is formed like a funnel at the bottom of the web, where the little creature lies concealed. To this are two passages or outlets, one above and the other below, very artfully contrived, to give it an opportunity of making excursions at proper seasons, of prying into every corner, and cleaning those parts which are observed to be clogged or encumbered. Still attentive to its web, the spider, from time to time, cleans away the dust that gathers round it, which might otherwise clog and incommode it; for this purpose, it gives the whole a shake with its paws; still, however, proportioning the blow so as not to endanger the fabric. It often happens also, that from the main web there are several threads extended at some distance on every side; these are, in some measure, the outworks of the fortification, which, whenever touched from without, the spider prepares for attack or self-defence. If the insect impinging be a fly, it springs forward with great agility; if, on the contrary, it be the assault of an enemy stronger than itself, it keeps within its fortress, and never ventures out till the danger be over. Another advantage which the spider reaps from the contrivance of a cell, or retreat behind the web, is, that it serves for a place where the creature can feast upon its game with all safety, and conceal the fragments of those carcasses which it has picked, without exposing to public view the least trace of barbarity, that might create a suspicion in any insects that their enemy was near.

The female generally lays from nine hundred to a thousand eggs in a season. These eggs are large or small in proportion to the size of the animal that produces them. In some they are as large as a grain of mustard seed; in others, they are scarcely visible. The female never begins to lay till she is two years old.

When the number of eggs which the spider has brought forth have remained for an hour or two to dry after exclusion, the little animal then prepares to make them a bag, where they are to be hatched, until they leave the shell. For this purpose, she spins a web four or five times stronger than that made for catching flies; and, besides, lines it withinside with down, which she plucks from her own breast. This bag, when completed, is as thick as paper, is smooth withinside, but rougher without. Within this they deposit their eggs; and it is almost incredible to relate the concern and industry which they bestow in the preservation of it. They stick it by means of their glutinous fluid to the end of their body; so that the animal, when thus loaded, appears as if she had one body placed behind another

If this bag be separated from her by any accident, she employs all her assiduity to stick it again in its former situation, and seldom abandons her treasure but with her life. When the young ones are excluded from their shells, within the bag, they remain for some time in their confinement, until the female, instinctively knowing their maturity, bites open their prison, and sets them free. But her parental care does not terminate with their exclusion; she receives them upon her back for some time, until they have strength to provide for themselves, when they leave her, never to return, and each begins a separate manufactory of its own. The young ones begin to spin when they can scarcely be discerned; and prepare for a life of plunder before they have strength to overcome.

Of this animal there are several kinds, slightly differing from each other either in habits or conformation. The water spider[1] is the most remarkable of the number. This insect resembles the common spider in its appearance, except that its hinder part is made rather in the shape of a ninepin than a ball. They differ in being able to live as well by land as water, and in being capable of spinning as well in one element as the other. Their appearance under water is very remarkable; for, though they inhabit the bottom, yet they are never touched by the element in which they reside, but are enclosed in a bubble of air, that, like a box, surrounds them on every side. This bubble has the bright appearance, at the bottom, of quicksilver; and within this they perform their several functions of eating, spinning, and sleeping, without its ever bursting, or in the least disturbing their operations.

THE TARANTULA[2]

Is a native of Apulia, in Italy. Its body is three quarters of an inch long, and about as thick as a man's little finger; the color is generally an olive brown, variegated with one that is more dusky; it has eight legs and eight

[1] *Argyroneta aquatica*, LAT. [2] *Lycosa tarentula*, LAT.

eyes, like the rest, and nippers, which are sharp and serrated; between these and the fore legs there are two little horns, or feelers, which it is observed to move very briskly when it approaches its prey. It is covered all over the body with a soft down; and propagates, as other spiders, by laying eggs. In the summer months, particularly in the dog-days, the tarantula, creeping among the corn, bites the mowers and passengers; but in winter it lurks in holes, and is seldom seen.

Thus far is true; but now the fable begins; for though the bite is attended with no dangerous symptoms, and will easily cure of itself, wonderful stories are reported concerning its virulence. At first, the pain is scarcely felt; but a few hours after, a violent sickness is said to come on, with difficulty of breathing, fainting, and sometimes trembling. The person bit, after this, does nothing but laugh, dance, and skip about, putting himself into the most extravagant postures; and sometimes also is seized with a most frightful melancholy. At the return of the season in which he was bit, his madness begins again; and the patient always talks of the same things. Sometimes he fancies himself a shepherd, sometimes a king; these troublesome symptoms sometimes return for several years successively, and at last terminate in death. But so dreadful a disorder has, it seems, not been left without a remedy, which is no other than a well-played fiddle. For this purpose the medical physician plays a particular tune, famous for the cure, which he begins slow, and increases in quickness as he sees the patient affected. The patient no sooner hears the music than he begins to dance; and continues so doing till he is all over in a sweat, which forces out the venom that appeared so dangerous. Such are the symptoms related of the tarantula poison; but the truth is, that the whole is an imposition of the peasants upon travellers who happen to pass through that part of the country, and who procure a trifle for suffering themselves to be bitten by the tarantula. Whenever they find a traveller willing to try the experiment, they readily offer themselves; and are sure to counterfeit the whole train of symptoms which music is said to remove.

THE GREAT AMERICAN SPIDER.[1]

This is one of the largest species of the tribe. Its back is covered with a hard, thick, brown coat, hollowed at the sides, and cleft transversely across the middle, as if it had a hole in that place. The head is small, and with difficulty distinguished from the corslet. The mouth is furnished with brown, hard, crooked teeth; the body is large and round, growing out into

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[1] *Mygale avicularia*, Lat.

two parts. Except the back, the whole body and the feet are covered with long bushy hair. The extremities of the feet are smooth and large, like the toes of a dog.

This hideous species of the spider tribe preys principally on small birds; in doing of which, it tears them to pieces to get at their blood, and afterwards sucks their eggs.

CLASS VIII.—MYRIAPODA.

Head distinct, with two antennæ; mandibles simple, incisive; feet on all or most of the segments of the body.

The animals of this class were arranged among the apterous insects by Linnæus, under the generic appellations of *Scolopendra* and *Julus*. Fabricius placed them as a division of his class Arachnides; and Dr Leach, in the Edinburgh Encyclopedia, fixed their characters as a distinct class, in which he has been followed by Latreille and the later writers.

The Myriapoda, allied to the two preceding classes in their general structure, approach the insects in the organization of their respiratory apparatus. This consists of two principal trachea or air tubes, extending longitudinally and parallel to one another, the whole length of the body, which receive the air by numerous lateral spiracles. Their sexual organs are also, as in these, single. The feet, indefinite in number, but always more than six, are inserted by single or double pairs on the segments of the body, and increase in number as the body is elongated from age. From their great number of feet, the animals of this class have been designated by the term *Millepedes*. The Myriapoda, in general, have the form of small serpents or worms, with an elongated body of numerous segments, and of the same thickness, and crowded with feet along its whole length. Their head is furnished with two short antennæ, composed of seven joints. They have two granulated eyes, formed by the junction of numerous and smaller smooth ones; two dentated mandibles, proper for bruising or cutting their food, and divided transversely by a suture; and a labium or lip without palpi, formed of united portions. The two or four anterior feet, joined at their base, are analogous to the pedipalpi of the crustacea. The stigmata or air vessels are often very small, and exceed in number those of insects. The nervous system in the Myriapoda is composed of a series of ganglia, one in each segment of the body, communicating by a longitudinal chord. The animals of this class are found under stones, the bark of trees, &c., and feed on

vegetable or animal substances. Latreille divides the class of Myriapoda into two orders, viz.

Order I. Chilognatha.—Antennæ filiform, of seven joints; mouth composed of two mandibles, and a lip divided by sutures; two or four anterior feet united at the base.

Order II. Chilopoda.—Antennæ setaceous, of fourteen joints and upwards; mouth composed of two mandibles, a multifid tip, two palpiform feet, and a second pair of feet united at their base, with a perforated hook.

THE SCOLOPENDRA,[1] AND GALLY-WORM.

Of these hideous and angry insects we know little, except the figure and the noxious qualities. Though with us there are insects somewhat resembling them in form, we are placed at a happy distance from such as are really formidable. With us they seldom grow above an inch long; in the tropical climates they are often found above a quarter of a yard.

The scolopendra is otherwise called the *centipes*, from the number of its feet; and it is very common in many parts of the world, especially between the tropics. Those of the East Indies, where they grow to the largest size, and are sometimes more than a foot in length, are of a ruddy color, and as thick as a man's finger; they consist of many joints, and from each joint is a leg on each side; they are covered with hair, and seem to have no eyes but there are two feelers on the head, which they make use of to find out the way they are to pass; the head is very round, with two small, sharp teeth, with which they inflict wounds that are very painful and dangerous. A sailor that was bit by one on board a ship, felt an excessive pain, and his life was supposed to be in danger; however, he recovered by the application of three roasted onions to the part, and was soon quite well. Of this animal there are different kinds; some living, like worms, in holes in the earth; others under stones, and among rotten wood; so that nothing is more dangerous than removing those substances in the places where they breed.

The gally-worm[2] differs from the scolopendra, in having double the number of feet; there being two on each side, to every joint of the body. Some of these are smooth, and others hairy; some are yellow, some black, and some brown. They are found among decayed trees, between the wood and the bark; as also among stones that are covered with moss. They all, when touched, contract themselves, rolling themselves up into a circle. Whatever may be their qualities in the tropical parts of the world, in Europe they are perfectly harmless; having been often handled and irritated without any vindictive consequences.

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[1] *Scolopendra morsitans*, Lin. [2] *Julus*.

All these as well as the scorpion, are produced perfect from the parent, or the egg; and to undergo no changes after their first expulsion They are seen of all sizes; and this is a sufficient inducement to suppose that they preserve their first appearance through their whole existence. It is probable, however, that, like most of this class, they often change their skins; but of this we have no certain information.

CLASS IX.—INSECTA.

Articulated animals with six legs, respiring by means of tracheæ; head distinct from the thorax; two antennæ.

This branch of science named Entomology, (from *εντομον*, an insect, and *λογος*, discourse,) including the most numerous class of organized beings, has but lately risen into merited consequence. The use of insects, indeed, in the economy of nature, was not likely to be estimated by men in the infancy of society, to whose wants or conveniences they were apparently little calculated to afford any addition. To some tribes, however, attention must have been early directed, on account of the ravages their united myriads enabled them to perpetrate; and others were early noticed as the industrious collectors of a species of food which man has long converted to his use.

The term *Insecta* is derived from the Latin *in*, into, and *seco*, I cut, from the body having the appearance of being cut or divided into segments; and a term of the same meaning, *εντομα*, (*εν* and *τεμνω*,) was used by the Greeks.

Linnæus, whose powerful genius enabled him, in this, as in other branches of natural history, laid the foundation or arrangements, from which all that has since been done has emanated.

The characters upon which Linnæus founded his arrangement, were chiefly the wings, and hence his system has been called the *alary system*. The class Insecta, of Linnæus, however, as it stands in the twelfth edition of his *Systema Naturæ*, included the crustacea and arachnides. He divides the whole into seven orders, viz.

I. Coleoptera, (from *κολεὸς*, a sheath, and *πτερὸν*, *a wing*.) Wings four, the upper ones crustaceous, with a straight suture.

II. Hemiptera, (from *ἡμισυ*, *half*, and *πτερὸν*.) Wings four, semicrustaceous, incumbent.

III. Lepidoptera, (from *λεπὶς*, *a scale*, and *πτερὸν*.) Wings covered with imbricated scales.

V. Neuroptera, (from *νεῦρον*, *a chord* or *string*, and *πτερὸν*.) Wings membranous, with ribs or nerves: anus unarmed.

V. Hymenoptera, (from ὑμην, *a membrane*, and πτερὸν) Wings membranous; anus aculeate.

VI. Diptera, (from δυω, *two*, and πτερὸν.) Wings two, with poisers in place of the posterior pair.

VII. Aptera, (from ἀ, *without*, and πτερὸν.) Destitute of wings or elytra.

Fabricius, a pupil of Linnæus, proposed an arrangement of insects, founded on their instruments of manducation. De Geer had, indeed, in the majority of his classes, added the characters derived from the mouth, to those afforded by the wings; but Fabricius carried the principle much farther, and made the *Trophi*, or *Instrumenta Cibraria*, as he termed them, the basis of all his divisions. To the labors of Fabricius, entomology is deeply indebted; for independently altogether of the merit of his arrangement, as an artificial system, it had the effect of directing the attention of his successors to parts indicating a corresponding difference in the character and structure of the animals. Subsequent writers have proposed various systems, combining the characters of Linnæus and Fabricius. The most prominent of these is that by P. A. Latreille, who, in 1796, in his *Précis des caractères génériques des Insectes*, limited the definition of the class, and whose object in his subsequent writings has been to divide his orders into natural groups. Cuvier, Lamarck, and others have also done much to increase the anatomical and general knowledge of insects, and to facilitate their study by appropriate arrangements; and Mr Macleay has suggested a very ingenious classification, founded on the quinary system, by which it appears that the groups, when arranged in circles of five, seem mutually connected together. Latreille divides the class of insects, as now restricted, into eleven orders.

I.—APTERA.

Order I. Thysanoura.
" II. Parasita.
Order III. Syphonaptera.

II.—ALATA.

Order IV. Coleoptera.
" V. Orthoptera.
" VI. Hemiptera.
" VII. Neuroptera.
Order VIII. Hymenoptera.
" IX. Lepidoptera.
" X. Rhipiptera.
" XI. Diptera.

The body of insects is divided into three principal parts, the *head*, the *thorax*, and the *abdomen*. The head, of which the surface bears many names, according to the position of its parts, such as the vertex, the forehead, the nose, the hood, and the cheeks, supports the antennæ, the eyes, and the mouth. The antennæ vary much in their composition and form. The anterous insects, which form the first three orders, and the coleoptera, have

never more than one kind of eyes; but many of the other orders, besides their compound eyes in facets, possess minute smooth ones (*ocelli*) in the form of brilliant points, sometimes to the number of two, generally three, disposed in a triangular form, on the top of the head. These organs are always immoveable. The *mouth* is composed of six principal pieces, of which four are lateral, disposed in pairs, and moving transversely; two other parts, opposed to one another, and filling up the space between these, being placed, the one above the upper pair, and the other under the lower

In insects which feed on solid substances, the four lateral pieces are considered as jaws, and the other two pieces as lips. The two upper jaws, generally horny, or scaly, similar to strong teeth, and without an articulated appendage, have been distinguished by Fabricius under the name of mandibles, (*mandibulæ*,) the two lower only preserving the name of jaws, (*maxillæ*). On the back of these are one or two jointed filaments, called *antennulæ*, but oftener *palpi*—a character which distinguishes them from the mandibles. They are generally narrow, elongated, compressed, horny or scaly, till near the origin of the palpi, with the upper extremity membranous or coriaceous, in the form of a reversed triangle, ciliated or hairy, and accompanied often on the internal side, by a smaller piece, named the internal lobe or division. The part or lobe forming the upper extremity of the jaw, sometimes appears in the form of a small palpus, of two joints, which is termed the internal maxillary palpus; in others it forms a vesicular, naked, vaulted appendage, called by Fabricius, from its form, *galea*. In both these cases, the extremity of the jaw, or the portion covered by the internal palpus or galea, is always horny, pointed, in the form of a hook or tooth, or armed with dentations or spines. These insects are always carnivorous or gnawers. When the jaws have neither internal palpus, or galea, are entirely horny, and armed with teeth, the insects may be considered as very voracious. The number of the exterior maxillary palpi varies from two to six. The two pieces opposite to these lateral parts have been termed lips; the upper one being generally termed *labrum* (*labium superius*). The under one, termed the *labium*, or *labium inferius*, is formed of two parts; one inferior, generally horny or coriaceous, is the chin, (*mentum*,) the other membranous, sometimes entire, sometimes notched, or trifid, and bearing the palpi, is termed *ligula*. These palpi have from two to four joints, and are called labial. They are generally shorter than the exterior maxillary palpi. The *pharynx* is situate between the jaws and the lip. The interior of the mouth in the Orthoptera, and some other insects, has a fleshy caruncle in the form of a tongue, or *epiglottis*. In the Hymenoptera, the pharynx is formed by a triangular process, named epipharynx or epiglossus, by Savigny. In this order, also, the jaws form small, compressed valves, and the chin becomes a kind of cylindrical or conical tube.

All these parts, as well as the labium, are often much elongated, and compose together a species of trunk or proboscis, which Illiger names *prœmuscis*,

and which Latreille calls a spurious proboscis; and in regard to this organ Lamarck considers the Hymenoptera as intermediate between the gnawers and suckers. Among the insects which feed on fluids, or which extract their food by suction, the organs of manducation appear under two modifications In the first, the mandibles and jaws are replaced by minute laminæ, in the form of setæ, composing by their union, a kind of sucker (*haustellum*) which is received into a sheath, the substitute for a lip, either cylindrical, conical, or jointed, termed the *rostrum* or beak in the Hemiptera, or membranous and fleshy, terminated by two lips, termed the trunk or *proboscis*, in the Diptera. The labium is triangular or conical, and covers the base of the sucker. In the second modification, the mandibles are excessively small, and in the form of a tubercle, more or less triangular, furnished with ciliæ on the internal margin; the lip is only distinguished by the presence of palpi; the jaws acquire an extraordinary length, and unite to form a proboscis or tongue, (*lingua*,) rolled up in a spiral form. Interiorly, this tongue is provided with three canals, of which the intermediate is the conduit of the nutritive juices; and at the base of the filaments is a minute palpus. The mouth of the Lepidoptera is an instance of this construction.

The trunk or *thorax* is that part of the body which unites the head to the abdomen, and to which are attached the organs of locomotion. It is formed of three segments, each with a pair of feet; but in the winged insects the upper sides of the last two segments also form points of attachment for the wings. The term *thorax* has been given to the upper surface of the trunk, and that of *breast*, to the opposite face below. The middle part of the breast between the feet, is the *sternum*, and the portion between the attachment of the wings, generally triangular, and sometimes very large, is named the shield, or *scutellum*. The anterior segment of the thorax, in a great many winged insects, is much larger than the other segments, and separated from the second, by a very marked articulation; in others it is extremely short, and has the appearance of a collar, while the two following segments, of greater size, are internally united, and form a rounded mass, distinct from the abdomen. In both these cases, the large naked portion receives the name of thorax.

The insects of the first three orders have but one species of locomotive organs, and only proper for walking; others have, also, wings to the number of four; and the posterior extremity of the thorax is furnished, in those which have only two wings, with two appendages, one on each side, termed poisers or balancers, (*halteres*,) and often other appendages in the form of spoonlike scales, (*squamulæ*,) or winglets.

The *wings* (*alæ*) are membranous, elastic, generally transparent, and attached to the upper sides of the thorax. The ribs or nerves, more or less numerous, which run through them, form sometimes a net-work, sometimes anastomosing veins. In wasps and bees, these wings, four in number, are naked and transparent; in butterflies, they are covered with minute scales, resembling fine powder, and embellished with

the liveliest colors. The scales are imbricated, each has a peduncle, and they form in conjunction, a kind of mosaic work, exhibiting the characteristic figures and colorings of this part. In the large class of Coleoptera, in place of upper or anterior wings, two large scales or plates, opaque, more or less thick and solid, and which open and shut longitudinally, forms for the membranous wings, coverings which are called *wing-cases*, or elytra, (*involucra*). In the greater part of the Orthoptera, these wing-cases, or upper wings, become thick and solid, and are furnished with ribs; in the Hemiptera, they are in a great part membranous; and the gradual transition from crustaceous coverings, to membranous and transparent organs, indicate that the wing-cases in the Coleoptera, though scarcely contributing to the action of flight, are modified wings. The form and disposition of the wings is much varied. In some they are straight and extended, or folded longitudinally like a fan, in repose; in others, they are folded transversely, as in the Coleoptera; and in others again, as the earwig, while one portion of the wings is folded transversely, the other takes the fan-like fold. The wings vary also in their place of position. In some insects, they are found inclined or sloped like a roof; in others they are placed horizontally, lying or crossed over one another, or sometimes separated; some, as the butterflies, raise their wings vertically in repose; and small hooked setæ placed along the side of the upper wings, serve to retain the lower ones in their position. In the nocturnal Lepidoptera, this is effected by a stiff, scaly, and pointed bristle. Among the insects with four wings, the form and relative size of these wings vary much. By their rapid motion, they often produce a humming sound; and among the males of some Orthoptera, a stridulous noise, which has been called their song. This sound is produced by the friction of the margins of their elytra upon one another, or by the rubbing of the posterior feet against the wings, and is conceived to be produced for the purpose of calling their females.

The feet in insects are composed of the hip or *coxa*, of two joints; the thigh, (*femur*,) the leg, (*tibia*,) and the toe, (*tarsus*,) divided into many phalanges. The number of joints in the tarsi is constantly five in some orders; but in others it varies from one to five, and sometimes even the posterior tarsi have a joint less than the anterior ones. Upon the difference in these members the principal divisions of the Coleoptera are established. The last joint of the tarsi is simple, or divided into two lobes, almost always terminated by two claws or hooks, between which, in many, are remarked from one to three membranous cushions or suckers. In the form of the feet, and particularly the tarsi, there are certain modifications, corresponding to the habits of the insects. The two anterior ones have sometimes the under part of the thighs grooved, and armed with slight dentations; and their legs or tarsi, in this case, terminated by a strong spine, fold with facility on the side of the thighs, and form an organ of prehension. The insects which have the anterior feet disposed in this manner, use them for

seizing their prey, and are termed *raptorii*. Others have the tarsi compressed and ciliated or even hairy, demonstrating their aptitude to be used as oars, or for swimming, and these are called *natatorii*. In the family of bees, the legs and the first joint of the tarsi are formed in such a manner as to brush off and carry away the pollen or dust from the stamina of flowers, and the tarsi and anterior legs in other species are sometimes broad, furnished with dentations or small spines, and calculated for digging in the earth (*pedes fossorii*.) These feet also in some are not subservient to motion, as in many Papilionides, and they differ in others according to the sexes.

The *abdomen*, forming the third and last part of the body, includes the viscera and the sexual organs. It is composed of from six to nine segments, each divided into two semicircles or plates united laterally, the under portion being termed the belly. The organs of generation are situated at the posterior extremity; and hooks or forceps of different forms accompany these parts in the male. The oviduct of many females is prolonged beyond the termination of the abdomen, sometimes in form of an articulated tube; sometimes as an ovipositor or auger (*terebra*,) composed of plates or filaments often dentated at the end. This oviduct terminates in a sting (*aculeus*) in the females and neuters of many hymenoptera. The exterior envelope of insects, which is more or less solid, serves the double purpose of outward protection and internal support. Less complicated than the skin of higher classes, it seems to consist of but two layers, the epidermis or outer skin, and the mucous tissue. Detached from the mucous tissue, the epidermis of insects is almost pellucid, or semi-transparent, and colorless. From its manner of growth, and the great proportion of gelatine in its composition, the substance of the outer envelope is of a horny consistence, more flexible than the coverings of the crustacea, when the phosphate of lime predominates over the animal matter.

The body of a caterpillar, deprived of the epidermis, presents the same colors as before; and it is conceived that the growth of the epidermis, being stopped by the layers which grow successively below, destroy the functions of the envelope, and occasion the change of covering observed to take place in the animals at this stage. The appendages of the skin consist of spines, hairs, and scales; the first two being merely prolongations of the epidermis.

The solid soft parts of insects are of two kinds. The first, termed *muscles*, are formed of soft fibres, disposed in bundles, capable of producing motion by their contraction in the parts to which they are affixed. These muscles are always attached to the harder parts by a tendon of a horny consistence. The other soft parts, formed also of muscular fibre, constitute the interior organs, which, with the fluids, perform the necessary functions of vitality. There are generally two muscles concerned in the motion of each part. The muscles which move the head are situate within the thorax, and the principal ones serve to raise or lower it. Within the thorax likewise are placed the muscles which move the wings and feet; and besides these are

some strong muscles approaching the dorsal or ventral portions, which appear intended to give to the breast a movement of compression or dilatation.

The *abdomen* in insects is composed of many imbricated rings, of which the one nearest the breast passes over the second, the second over the third, &c. The muscles which move these parts extend along the anterior margin of one segment, to the posterior margin of that which precedes it, and give more or less motion upwards or downwards, according to the structure and junction of the separate parts. The feet are provided with flexor and extensor muscles at every articulation. When the thigh is slender and cylindrical, the motion is confined to walking; when thick and tumid, to give room for the requisite muscles, the motions indicated are leaping and swimming. The muscles of insects in general are extremely numerous, very irritable, and many of them extremely minute. In the caterpillar of one species, (*Cossus ligniperda*) Lyonnet reckoned upwards of four thousand different muscles, while those of the human body do not exceed five hundred and twenty-nine; and the strength of these muscles is such, that some caterpillars are able to suspend themselves horizontally in the air for hours, supported by their posterior feet on a vertical surface.

The *nervous system* of insects is the same as in the annelides, the crustacea and arachnides. From the brain, or what is considered equivalent to the brain, the nervous matter in the head, originate threads, which extend to the eyes, to the antennæ, and to the mouth. From its posterior extremity arise two chords or one pair of nerves, which, forming a collar, embrace the œsophagus, and, uniting below in a ganglion, give off filaments to the surrounding parts. Two chords more or less approximated, often united, are prolonged from thence along the under part of the body, forming at intervals other ganglions, varying in number, till the filaments reach the anal extremity. What is called the brain differs but little from the other ganglia, and is distinguished by this appellation, only because the nervous threads of the head seem to be derived from it. Many consider these ganglia or knots, as so many little centres of nervous energy, and thus explain why, when an insect is cut into small portions, it displays for some time marks of sensation.

In insects, two kinds of *eyes* occur, the first compound, or composed of facets, the others simple and smooth. These eyes are immoveable, and destitute of ciliæ, or eyelids. The optic nerve, at some distance from its origin, is extended to form the retina, and divided into a number of hexagonal threads, which, passing through the network of a circular trachea, go to a membrane, generally cellular, called the choroid coat, and after having traversed the posterior part of the cornea, are applied against the facets or multiplied faces of the external eye, take their figure and become individual retinæ. Those species which shun the light are destitute of the choroid coat. The pigment which covers the upper surface, and that which covers the opposite side of the cornea is opaque, slightly fluid, and adheres strongly. The cornea is composed of a hard elastic membrane, with the surface reticulated or

divided by small hollow lines, often furnished with hairs, and a number of hexagonal facets. Lewenhoeck has counted three thousand one hundred and eighty-one in the cornea of a beetle, and eight thousand in that of a moth. The butterfly has seventeen thousand two hundred and thirty-five. Each facet may be considered as a crystalline lens, concave within and convex without.

The organ of *hearing* is not manifest in insects, although most of them possess this faculty to a certain extent; for in the coupling season, many males have the power of producing a noise to call the females, as in the grasshopper and cricket. The sense of smell is more evidently manifested both in their larva and perfect state, from their instantly discovering and crowding to places where their food is to be found, or to substances proper for the deposition of their ova, and where they were not previously seen. The seat of this faculty some naturalists are inclined to believe is in the antennæ, while others, as M. Dumeril, suppose it to be at the entrance of the tracheæ or stigmata. On the other hand, Brunnich, Olivier, and Marcel de Serres are of opinion that the sense of smell resides in the palpi; and experiments on bees have rendered it probable that the chief sensations are communicated by the mouth. From the proboscis being more or less developed, as the palpi are minute or wanting, M. Lamarck considers this supposition the correct one. The organs of touch have been generally considered to be those named *antennæ* or feelers; and insects destitute of them use their palpi and the tarsi of the anterior feet for the same purpose. The covering of the body being generally corneous, can communicate but feebly the sense of touch.

In insects, distinct absorbing or circulating vessels have not hitherto been discovered. A dorsal vessel, or long transparent canal, reaches indeed from the head to the posterior extremity of the body; and this has been conceived to be equivalent to the heart and blood-vessels of the higher classes. But this vessel, though narrowed at intervals, corresponding to the segments of the body, and having an undulatory contraction and dilatation from the head to the posterior extremity, possesses none of the characters of a true heart or circulating system; and it is considered to be the only chief reservoir of the principal fluid in insects, filling and emptying itself by absorption and exudation. M. Carus, however, has discovered in the caudal laminæ of some larvæ, and in the rudimentary wings, an excurrent and incurrent motion of fluid in distinct tubes, which he conceives to be a true circulation; a circumstance which has escaped the penetration of Lyonnet, who always found the undulatory motion of the dorsal vessel to proceed invariably from the head to the tail. As this circulation, or double motion, however, has only been observed in one stage of existence, it is rather to be regarded as a phenomenon connected with the passage of the animal into a different state, than as a circulation analogous to that of animals, with two distinct sets of vessels.

Respiration in insects is effected by means of two tubes, one on each side of

the body, and running along its whole length, named *tracheæ*. From these tracheal vessels are derived a great many ramifications or *bronchi*, the number of which is more or less considerable, as they belong to parts enjoying more or less vital energy. The tracheæ communicate with the external air by means of openings called *stigmata*, of which the number varies, placed on each side of the body. In caterpillars, the number of stigmata is generally eighteen. These stigmata are marked in the skin of the insect by a small scaly plate, open in the centre, and furnished with membranes or filaments to protect the entrance. The larvæ of many species which live in water, have on the sides of their body, filaments or appendages in the form of laminæ, upon which are spread vessels communicating with the bronchi and tracheæ.

Though insects have no lungs, and are destitute of voice properly so called, yet they possess the means of producing sounds. Thus the male grasshopper makes a noise to attract the female. The males of the cicadæ and the crickets possess the same faculty. In all these insects, however, the means by which the sound is produced, is similar to that by which a stringed instrument or drum is sounded. The males of the locust and grasshoppers have a portion of the internal margin of their elytra formed of an elastic, transparent membrane, like talc, provided with strong projecting ribs, separated by large hollow spaces. It is a kind of violin, of which the ribs represent the strings; and the sharp, disagreeable sound by which these insects are distinguished at a distance, is produced by rubbing the elytra over one another. In the cricket, the thigh, furnished with projecting lines, serves as the bow, and the longitudinal ribs of the elytra the strings. In the cicadæ, the organ which produces the sound is more complicated. It is a species of drum, and is peculiar to the male. The abdomen, which is conical, is provided below and near the base, with two large semicircular scales, which cover an empty space, in which is a delicate, tense membrane, equivalent to the skin of the drum, and below this membrane, at the bottom of the cavity, are other parts, which, striking against it, produce the sound. The stridulous noise which is heard when the *Sphinx atropos* is touched, is occasioned by the air escaping rapidly by the tracheæ at the sides of the base of the abdomen, and which is closed in the state of repose by a bundle of stellated hairs. Many coleoptera produce a plaintive and interrupted sound by rubbing the peduncle of the base of the abdomen against the interior walls of the thorax; and the extremity of the head in others produces a similar sound. The rapid vibration of the wings is the chief cause of the humming noise which most insects produce when flying.

Insects feed on all kinds of matters, vegetable and animal; and there is scarcely any production in these two divisions of nature, which does not serve as the food of some insect. Each insect, besides, has a particular food upon which it lives in preference, and which it is endowed with the power of discovering and procuring. Many in their perfect state live on food quite dif-

ferent from that upon which they subsisted when in the state of larvæ; and yet, notwithstanding of this, they instinctively deposit their ova upon the peculiar matters necessary for the food of the young. Thus the lepidoptera, which in the perfect state, suck the honey of flowers, never fail to place their ova on or near the plants, the leaves of which are proper for the nourisnment of the caterpillar; and thus it happens that the culices, whose larvæ are destined to live and find their subsistence in water, drop their ova on its surface.

Among the insects which live in society, there are some, as the bees, which are under the necessity of making choice of a dwelling for the purpose of storing up a supply of provisions for unfavorable seasons, which would prevent the acquisition of a daily supply. Others, such as the ants, unite and work in common, to procure not only their own subsistence, but food for their larvæ, which are totally incapable of seeking it for themselves.

Many insects seem confined to one species of food, and never vary in their taste. Such are a great number of caterpillars, which feed on certain leaves, and if these fail, they die. The herbivorous insects besides, eat often, and almost continually; while those living on prey, like the carnivorous animals of the higher classes, are capable of considerable abstinence. Certain species of insects subsist on the leaves of trees, such as the larvæ of the lepidoptera, and many of the coleoptera and hymenoptera; others suck the juices of the leaves and stems, as the cicadæ, and the aphides; some feed on the vegetable excrescences, named galls, and many on the buds of trees. Fruits of all kinds are the subsistence of many insects and their larvæ; while others prove powerful destroyers of the different species of grain. Even the solid matter of trees becomes the food of many larvæ, which perforate the timber in all directions, reduce it to powder, and devour the particles. A food more delicate is necessary for some insects, and this is found in that part of flowers termed by botanists the *nectary*. From these nectaries the bees collect the fluid, which, after having undergone some preparation in their bodies, forms the substance termed honey; and the ants seek with avidity the saccharine fluid which is exuded from openings in the abdomen of the aphides, caressing them till this evacuation, so necessary to them, is produced.

A crowd of insects, both in the larvæ and perfect state, are found in the dung of animals; and dead animal matter of all kinds, particularly that of quadrupeds, birds and fishes is equally sought after by numerous species. The flesh-fly is well known to deposit its ova in butcher's meat exposed; and the feeding of these minute animals within the meat, accelerates putrefaction and dissolution. Even the dried flesh of animals, and their skins preserved in museums, are the prey of small coleoptera of the genera *Dermestes Ptinus*, &c.; and these minute animals likewise destroy the most valuable furs. Other insects attack living animals, and feed on their solid and fluid parts. One larva in particular, belonging to the genus *Œstrus*

lives on the back and under the skin of horned cattle, and feeds on the pus which is formed by the tumors occasioned by their residence. Other larvæ of the same genus are found in the stomach of the horse, around the pylorus, and sometimes in the intestines; and sheep, horses, and oxen feed the larvæ of another species of *æstrus* in their frontal sinuses, on the fluid which exudes from the nose. In short, no animal seems free from the depredations of insects; and some larvæ live even in the interior of the body of other species, as the large family of the ichneumons, the *cinips* of Geoffroy, and the *sphex* of Linnæus.

The *organs of deglutition*, in insects, present nothing very remarkable. The œsophagus is a straight canal, passing between the brain and the first nervous ganglion. It is surrounded by the nervous matter which joins the two principal organs of sensation. This part of the œsophagus is perhaps the seat of the organs of taste. In the gnawing insects, the alimentary matters, after having been cut and reduced to small portions by the action of the mandibles, are carried to the pharynx. In the suckers, the nutritive fluids are carried there by the pressure of the sucker.

The *organs of digestion* comprise the stomach and the intestinal canal. These are, according to M. Marcel de Serres, formed of three membranes. The stomach presents great variety in point of form, and has been distinguished by Latreille, into three kinds, which he distinguishes as simple, double, and multiple. The stomach of the first form occurs in the greater part of the insects. In some it is simply membranous; in others it is muscular; and in a third group it is not evident, that is, the œsophagus is not dilated. Those which have the stomach membranous and dilated, live generally on the nectar of plants, such as the bees, butterflies, &c.; those in which the stomach is muscular, are chiefly the hemiptera; and those in which this viscus is not dilated, feed commonly on leaves or roots, which they gnaw and eat. The insects which have a double stomach are the coleoptera which feed on living prey, such as the *hydrocanthari*, the *cicindeletæ* and the *carabidæ*. The greater part of the orthoptera are remarkable for the apparent multiplicity of their stomachs. The mole cricket of gardens has four. This insect and others analogous have been considered as ruminating insects, or as having the faculty of returning again to their mouth the aliments in their organs of digestion. In insects, it is to be remarked, there often exist great differences in the structure of the intestinal canal, properly so called, in the state of larvæ, and in the perfect insect. Thus, in the caterpillar of the butterfly there is an œsophagus dilated abruptly to form a cylindrical stomach, with three transverse rows of cœcums totally different from the form of the same parts in the perfect insect. Similar differences have been observed in the larva of the bee, and indeed occur in many groups. This change of structure is necessary for the accommodation of the animal to its changes of food; but when the larvæ and the perfect insect feed on the same materials, this alteration in organization does not take place.

Besides the secreting organs proper to nutrition and generation, others are found in certain insects for secreting fluids, either calculated for defence, or for protecting them from variations of temperature during their transformations. The acrid and fetid fluids with which some insects defend themselves, are produced by small tortuous tubes, and accumulated in two vesicles near the anus.

The *Carabi* and the *Dytisci* secrete acid fluids which redden vegetable blue; the *Brachini* discharge an acid vapor, which gives considerable pain; a species of *Blaps* produces a brown fetid oil, which swims upon water; the silk-worm possesses organs for secreting a silky matter of which the threads of silk are formed; and in the Hymenoptera, such as wasps, bees, sphexides, &c., the extremity of the abdomen incloses a sting, calculated for attack or defence. This sting is a hollow canal furnished with muscles, of which the contraction or dilatation projects, or withdraws it at the will of the animal. At the base of this hollow tube is found a gland which secretes the acid or poisonous fluid. The sexes in insects are always in separate individuals, male and female, and coupling takes place at certain seasons, as in the higher animals. The only exception to this rule occurs in some genera of the order Hymenoptera, where, besides the males and females, a third kind of individuals occur called *neuters*. These, from what has been observed in the economy of the bees, who, when a new queen is wanted, rear one of the larvæ of the neuters for this purpose, and conceived to be imperfectly developed females. The males are distinguished from the females, by their reproductive organs, by their smaller size, and in general more brilliant colors; by the form of their antennæ, and sometimes by their having wings, while the females are apterous. Reproduction takes place in the last or perfect state; and after impregnation, the females, with instinctive sagacity, deposit their ova, of various forms, on objects or places where the young animal, when hatched, may find its appropriate food.

Insects are in general oviparous animals; for though a few, which have been termed ovo-viviparous, bring forth living larvæ, as the flesh-fly, or as the *Hippobosca equina*, produce their young in the pupa state; yet, generally speaking, the whole class may be considered as oviparous. The ova are of two kinds; some with a membranous covering like those of reptiles, and the others crustaceous like the eggs of birds. The variety, however, in point of form, among these ova, is almost incredible; nearly equal, it may be said, to the number of the species. Some are round, elliptical, lenticular, cylindrical, pyramidal, flat, and even square; some are smooth, others figured or grooved; and in point of color every shade is employed, some shining with the lustre of pearls, and others with the hue of gold. And these ova are all deposited with the most unerring instinct in places where the future animal may find its proper food without the parent's care.

The number of ova deposited by particular insects is extremely various, but in general it may be remarked that the fertility of insects exceeds that

of birds, and is only surpassed by the almost unbounded reproductive powers of fishes. Lewenhoeck found that a single fly could produce in three months seven hundred and forty-six thousand four hundred and ninety-six flies, similar to itself; the silk-worm moth deposits about five hundred ova; the tiger-moth sixteen hundred. And in insects living in societies like the wasp and bee, whose manners have been more the subject of observation, the reproductive powers are still greater. The female wasp deposits at least thirty thousand, and the queen bee from forty to fifty thousand. But all these are left far behind by a species of the white ant (*Termes fatale*), the female of which deposits not less than sixty ova in a minute, three thousand six hundred in an hour, or eight hundred and sixty-four thousand in a day!

The most remarkable feature in the history of insects, is the transformations the same individuals undergo during the different stages of their existence. These transformations, more wonderful than the fabled metamorphoses of the pagan mythology, have been adduced in proof of the argument for the existence of design in the conduct of the universe. But to the student of nature, even this instance, however striking, is not wanted to establish proofs of design the most admirable, and beneficence the most unbounded, in the structure and preservation of the almost infinitely numerous tribes of organized beings; since every portion of nature exhibits facts of the same kind, impossible to be explained without reference to Infinite Wisdom and Almighty Power.

The transformations or metamorphoses of insects embrace three states in which the animals appear, and which form as many great periods of their life. In the first, they have no wings, and some even possess no organ of movement; in the second, the animal falls into a state of torpor or apparent lethargy, for a longer or shorter period, during which its future organs are completed; and the third displays the perfect insect in the full possession of of all its members and animal faculties.

In the first state, the animal, under the form of a small worm, is termed the larva, or caterpillar. These larvæ appear in two states; 1. Those which, in general form, more or less resemble the perfect insect; 2. Those which are wholly unlike the perfect insect. The first of these includes, with the exception of the crustacea, nearly the whole of the Linnæan orders, *Aptera* and *Hemiptera;* the second comprises, with few exceptions, the whole of the Linnæan orders, *Coleoptera*, *Lepidoptera*, *Hymenoptera*, *Diptera*, and the greater portion of the *Neuroptera*. Previous to their change, the larvæ exhibit appearances of the greatest anxiety and restlessness. They cease to eat, wander about with instinctive care, seeking for holes in the earth, chinks in trees, crevices in walls, and other places for their temporary repose. Many penetrate the ground to the depth of several inches; the grubs of the gad-fly creep out of the backs of the cattle, and drop upon the ground, or are carried by the animal, licking itself, into its mouth and through its intestines; and the various aquatic larvæ leave the water for an

element more suited to their future existence. The *coccinellæ* and others fix themselves by the anus under leaves or twigs; others suspend themselves by a silken thread; and a very great number enclose themselves in cases or cocoons composed of silk and other materials, to undergo their final change. The second form in which insects appear is the *pupa* or *nympha* state. In this, the number of the exterior organs of the animal is augmented or developed anew. Linnæus presents the forms under which insects appear in this state under five heads. The whole, however, may be reduced under two heads: first, those in which the transformation is partial; and secondly, those in which it is complete.

The influence which the *partial metamorphosis* exercises on the body is not sufficiently powerful to destroy the typical form proper to the species, and is modified only by slight alterations. An experienced eye which has seen the animal in its first stage of life, can still recognise the individual. The principal change takes place in the exterior members, and particularly in the organs of locomotion; but the animal retains its habits and activity. In the perfect or complete transformation, on the contrary, the larva is so different from the perfect animal, that nothing but ocular evidence of the change can convince of its identity. The pupæ of this metamorphosis, although their forms are shortened, and somewhat similar to those which they are to acquire in their last change, take no food, remain immoveable, and give no external sign of life. The term *chrysalis* is applied by many writers to insects in the pupa state. The period insects continue in the pupa state is various. Some species remain only a few days under this form, others as many months, or even years. Each, however, has in general a stated period, which is seldom or never exceeded. As Lamarck has observed, there seems between the insect races and the vegetable kingdom a correspondence of developement. The larvæ are produced from the ova when the food of many, the leaves of plants, begin to appear; and the perfect insect from the same larvæ, as in a great portion of some orders, appears in its changed form, when food adapted to the animal is prepared in the nectaries of the expanded flowers. The duration, however, of the pupa state, may be prolonged in certain cases, beyond the average term. Thus it has been found, that according as the insect becomes a pupa at an earlier or later period of the season, it will remain in this state for a few weeks or several months, according to circumstances.

The caterpillar of the *Papilio machaon*, one of those which have a double brood in the year, if it becomes a pupa in July, the butterfly will appear in thirteen days; if not until September, it will not make its appearance until June, in the following year. The same is the case with a vast number of other insects, and their developement has been thus discovered to depend much on the temperature of the season, or, which is the same thing, on the developement of plants destined to afford them protection and support. In the month of January Reaumur placed several of the pupæ of moths and

butterflies, which would not naturally have been developed till the following May, in a hot-house, and the result was, that the perfect insects made their appearance in a fortnight, in the depth of winter; and by other experiments he ascertained that in this high temperature the change was accomplished in five or six days, which would have required as many weeks in ordinary circumstances. The converse of this experiment equally succeeded; for by keeping pupæ in an ice-house during the whole summer, the production of the fly was retarded a full year beyond the ordinary period. And it is a fact well ascertained that the pupa state sometimes continues for years — thus providing for the continuance of the species, should adverse seasons threaten to destroy the inclosed animals before they had carried through the great purpose of nature by reproduction. The mode in which insects break through their prison-house or coccoon, and assume the perfect form, is various. Previous to this period, the color of the pupa undergoes an alteration: the golden or silver tinge in many vanishes, and those which are transparent usually permit the form and colors of the insect within and the motions of their limbs to be seen. In the *obtected* pupa, the struggles of the included butterfly or moth first effect a longitudinal slit down the middle of the thorax, where there is usually a suture for the purpose, and the insect gradually withdraws itself from its case. The members are also withdrawn from a a series of inner membranous sheaths, which separately include them like a glove. In the *coarctate* pupa, where the outer case is generally more rigid and destitute of sutures, a lid or operculum is found at the anterior end which the animal is enabled to push off; and the coleopterous insects, whose temporary dwelling is under ground, await the progress of the developement, and hardening of their elytra, before mining upwards to the open air. In other families, the coccoon is ruptured by the inclosed insect; or in cases where the portions of the cases have been glued together, that glue is dissolved by a solvent fluid, and the animal left free to escape; and among the ants, the working class not only feed the young previously, but at their period of transformation cut the minute threads of the coccoons when the insect is ready to appear. In the gnat, which undergoes its change on the surface of the water, the pupa-case splits like a little boat, and the animal raises itself from the horizontal to the vertical position, extricates its members from their confinement, rests for a moment on the water till its wings are unfolded, and flies away.

The last stage of the life of insects is termed the *imago* or perfect state. In this state all their parts are fully developed, and it is only in this stage that they are qualified for the great purpose of reproduction. Immediately upon their exclusion, insects are generally weak, soft, and languid; and some short space of time is required for the expansion of the members, calculated for action in a different situation or in a different medium. The elytra assume their brilliant colors; the wings expand to their proper size, and assume their various workings; and what seemed a few minutes before

but an inanimate half-formed mass, is now transformed into an animal decked with the most vivid colors, and rejoicing in its new existence. The operation of expanding their wings in by far the greater number of insects occupies only a few minutes; in some butterflies, half an hour or an hour; and some species of *sphynx* require several hours or even a day for this operation. In certain *tipulæ* and the *ephemeræ*, however, this process is almost instantaneous; and in some species of this last genus, the insects, after being released from the puparium, and making use of their expanded wings for flight, undergo a slight and further metamorphosis. They fix themselves by their claws in a vertical position upon some object; withdraw every part of the body, even the legs and wings, from a thin pellicle which covered them like a glove; and so perfect is the resemblance of this exuviæ to the insect, as to be at first sight mistaken for it.

When the developement of the perfect insect is thus fully completed, it immediately begins to exercise its new powers in their destined functions. It walks, runs, or flies, in search of food, or of the other sex of its own species if it be a male, that the great purpose of its existence in this state may be fulfilled, the continuation of the species; and so unerring are its intuitive perceptions of the food which is proper, and the protection which it requires, that the new-formed being becomes at once a free denizen of the air, distinguishing with more than botanical skill the plants and their juices which are necessary for its wants; and guided at once to results which in other beings are only acquired by the slow lessons of experience or education. The duration of insect life in the *imago* or perfect animal is subject to some variations, but in general concludes when reproduction is perfected. There is not, as in the larger animals, a duration of a medium period, only liable to be shortened by accident or disease; but a conditional one, dependent on the earlier or later fulfilment of a particular function. The general law regarding this period among insects seems to be, that a few days, or at most a few weeks, after the union of the sexes, and the deposition of the ova by the female, both individuals perish. The period of effecting this is longer or shorter according to the species. Some, as several *ephemeræ*, live only a few hours, and never enjoy the enlivening light of the sun, appearing only to fulfil the great purpose of nature after sunset, and having finished this in the course of a few hours, by dropping their ova on the surface of their native waters, perish before the dawning of another day. Others, as flies, moths, butterflies, and indeed the greater part of insects, take a few days or weeks, to accomplish the same purpose. A comparatively small number, such as some of the larger coleoptera, orthoptera, &c., exist from six to nine, twelve, and even fifteen months; and some instances have been recorded of particular species, when kept and fed, having their existence prolonged considerably beyond this term. But these are exceptions to the general rule. And it is to be remarked further, that insect life seems to follow a different law from that which prevails among vertebrated animals, where the duration of

existence is generally observed to be in relation to the period of their attaining maturity—that is, that an animal is long or short lived, in proportion as it attains puberty in a longer or shorter period. Among insects, this analogy does not hold; for while the larvæ of the goat-moth (*cossus ligniperda,*) is three years, and that of the cabbage butterfly, not three months in attaining maturity, yet the perfect insect in both lives equally long. The *Melolontha vulgaris*, which exists four years in its preparatory stages, lives only eight or ten days as a perfect insect; some ephemeræ, whose larvæ have enjoyed two years of preparatory existence, scarcely live beyond an hour; while the common flesh-fly, whose larvæ have attained to maturity in three or four days, exists several weeks. It is worthy of remark, as connected with this subject, that although the general rule seems to be that insects die immediately or soon after the period, when the continuance of the species is provided for by their coupling, and the deposition of the ova, yet if the junction of the sexes be prevented, such individuals seem exempted from the general law. It is probable that some of the instances related of insects having been kept for long periods in the perfect state, have been individuals who had not by the sexual junction fulfilled one important purpose of their being. Gleditsch asserts, that by keeping apart the sexes of the grasshopper, their lives were prolonged to eight or nine weeks, in place of two or three, the general period of their existence; and under similar circumstances, *Ephemeræ*, which naturally perish in one day, may be kept alive for seven or eight.

The associations among insects for a common purpose are temporary or continued. The temporary ones owe their origin to a female who has survived the winter, and who lays the foundation of the colony, of all the members of which she is the common mother. Such are the associations among wasps and hornets. The female queen begins the edifice, and deposits ova in the first formed cells, which are destined to produce assistants, to people and complete the colony. The insects first developed are all neuters, or workers. To these, all the labors of the family are committed. In certain communities of *Termes*, or white ants, the neuters form a body of soldiers ready to defend the commonwealth from enemies, or to make regular war on rival communities, with all the precision and detail of military operations.

All insects which live in society, with the exception of the *Termes*, undergo a complete metamorphosis. Among the *Termes*, the young differ but little from the full-grown insect, except in point of size, the absence or shortness of wings, and other distinctions of slight importance. Among the ants, the neuters are deprived of wings; but in all the other societies, the three kinds of individuals have wings. The instincts of these societies are modified according to their organic differences. Deprived of wings, the neuters or workers among the ants form their dwelling in clefts of trees, walls, or under ground. The wasps and bees, on the contrary, whose wings

enable them to enlarge the sphere of their industry, have a greater choice of material and a wider range of action. Thus the dwellings of the hornet are formed of a light papyraceous substance, admirably adapted in the lightness of the material for being suspended in the air, and as wonderfully constructed within, for the number of its inhabitants; while the bees collect a resinous substance, inpermeable to moisture, and capable from its ductility, of being moulded into any form.

In the societies of insects which exist in a mixed form, that is, where there are workers of one or two other species, the internal economy and arrangements are so wonderful, that, unless the fact had been witnessed and related by such naturalists as Humboldt and Huber, it would scarcely have commanded belief. The workers of different species found in these warlike communities, taken by force in their early age, from neighboring ant-hills, become in their perfect state the auxiliaries of the captors or their slaves. But all the neuters of these communities have neither the same form nor functions; for some which M. Huber distinguishes by the name of Amazons, have long, narrow, arched mandibles without dentations, which, from their form, are neither proper for carrying nor preparing the materials of their habitation, and are evidently rather constructed as arms, for offence and defence, than as tools for mechanical arts. These individuals are, therefore, intended by nature for warriors; to fight seems their strongest predilection; and the rearing of their young, the most general instinctive feeling of animals, is in their case committed to the care of strangers whom they have taken captive. The other working ants do not take a part in the predatory excursions, unless driven to it by extreme want. The Amazonian ants, at a certain hour, quit their dwelling, and march in close column, more or less numerous, according to circumstances, towards the ant-hill previously reconnoitred — fight their way to its recesses, in spite of opposition — sieze in their mouths the larvæ and pupæ of the neuters or workers, and, putting themselves again in marching order, return with their captives to their own capitol. It is upon the species named *F. fusca*, that they chiefly exercise their power. M. Huber, led by a very striking analogy, compares the captured ants, retained as workers by these warlike hordes, to the Helots of the Greeks and Romans, or to the negro slaves of modern Europeans.

The *Formica sanguinea* affords an instance where all the workers are of similar forms, and engage in the same labors; and, though they do not seem to have a kind of standing army among them, like the Amazonian ants, follow the same warlike propensities. M. Huber has detailed the tactics of these small animals from observations made in the cantons of Switzerland, where the species is common, and demonstrated that the scourges of war and slavery are not confined alone to human beings. The bee, however, presents instinctive faculties of a more amiable nature. It has no carnivorous propensities; and while some of the other insects which live in societies, subsist by rapine and destruction, this interesting animal pursues its peaceful

labors, collecting honey and wax from sources inaccessible to human means, and presents a model of industry and foresight which has often been held up by moralists as instructive to man.

The migrations of insects, or rather their appearance in certain countries, at certain periods, laying waste whole territories by destroying the crops, and eating up every green leaf and blade of grass, do not seem referable to the same causes as the migration of birds and fishes. The appearance of locusts (*Gryllus migratorius*, Lin.) in Barbary, Egypt, and Tartary, and their occasional irruptions into the south of Europe, are rather to be attributed to the excessive multiplication of the species, from causes favorable to reproduction, than to any periodical, instinctive impulse; and their occasional dispersion, in countless numbers, over the neighboring countries, may originate in the necessity of finding a supply of food. The direction of their flight, in their migration, is generally regulated by the blowing of the wind. In places visited with this scourge, the inhabitants eat these insects, either using them when recent, or drying and grinding them as a substitute for bread. Since the year 1749, though certain parts of Russia, Poland, and Hungary are occasionally visited by flights of locusts, Europe has been free from any very alarming influx of these animals. In that year, they carried destruction over the fairest provinces of Germany, and even extended their flight across the Baltic to Sweden. The temperature of the bodies of insects is very nearly that of the atmosphere, and thus many of these animals, and above all the larvæ, pass the winter in a state of torpor. In those which live in society, however, such as bees, the temperature of the hive is always somewhat higher than the external air. But the temperature which is necessary to develope one species, is not necessary to all, and hence the distribution of insects over the world, in every variety of climate. It has been observed that where the empire of Flora terminates, there also terminates the domain of Zoology; for animals which feed on vegetables cannot live in places totally sterile; and those which are carnivorous must be equally deprived of subsistence. Those countries richest in vegetable productions, are therefore the most prolific in insects; and as vegetation diminishes, the number of insects decreases. But the proper limits of the different insects in geographical positions, are far from being ascertained; and all that is generally known is, that there are tribes peculiar to the warmer regions of the globe, and others that belong to the temperate latitudes; that some are extremely local; and that others feed on vegetables of extensive dissemination. M. Latreille is of opinion, that, if the geographical range of insects were well known, and the species ascertained, a connection between the vegetable productions of the soil, and the animals, might be traced; and a clue might be thence procured for ascertaining from their insect inhabitants, to what portions of the newest continents the multitude of islands in the Asiatic ocean originally belonged.

There is no data for ascertaining with any degree of accuracy the actual number of insects distributed over the surface of the globe. In reference to

the plants upon which they feed, Decandolle conjectures, that sixty thousand species being already known, the total number of plants may extend from one hundred and ten thousand to one hundred and twenty thousand. And Messrs Kirby and Spence, reasoning on this calculation, and that several insect inhabitants are often found upon the same plant, conjecture that four hundred thousand insect species may exist on the surface of the globe: and, proceeding on the same data with regard to the plants of that country, that the insects indigenous to Great Britain may be estimated at ten thousand. Including the *Arachnides* and *Crustacea*, one hundred thousand species are computed already to have a place in cabinets.

The slow progress of the science of entomology has left to be discovered by future inquirers, many of the uses of insects in the economy of nature. From what is known, however, of certain races, the analogical inference, regarding the whole, may be deduced, as equally proofs of Divine wisdom and beneficence. Myriads of these small and incessant workers, by their feeding on dead, decayed, or excrementitious matters, not only preserve the atmosphere in purity, but themselves enjoy the blessings of existence. Some furnish an agreeable food, and others are employed in medicine and the arts. Many form the chief or only subsistence of quadrupeds, birds, and reptiles, and the silk-worm furnishes one of the most beautiful materials of dress. It has been remarked that from the study of entomology, many useful arts might have been derived. Thus the hornets composed their dwelling of a species of paper, long before the manufacture of that invaluable article was stumbled on by human ingenuity; the *Tenthredines* or saw-flies, cut the branches of trees with their serrated instruments, long before the use of the saw was discovered in the arts; and their small but powerful instrument has still this advantage over the mechanic's tool, that it combines the properties of a rasp and file, along with that of a saw. The wood-boring bee and the ichneumons are possessed of an apparatus for boring, from which even human ingenuity may improve their implements destined for similar purposes. A small animal of the size of the common ant, (the *termes*,) builds in an incredibly short space of time, in Africa and Asia, a dwelling of fifteen or sixteen feet in height, upon which the pick-axe makes no impression; and finally, the organs with which the butterflies, the culices, and the common flies pump up the juices upon which they feed, might possibly afford hints for improvement in instruments used for a similar purpose in the arts. "These animals," says Latreille, "are often so minute, that one cannot even discover their forms without the aid of the microscope; but to the eye of the philosopher, the mass or volume of an object is a matter of little consequence. The wisdom of the Creator never appears with more effect than in the structure of those minute beings, which seem to conceal themselves from observation, and Almighty power is never more strikingly exhibited than in the concentration of organs in such an atom. On giving life to this atom, and constructing in dimensions so minute, so many organs,

susceptible of different sensations, my admiration of the Supreme Intelligence is much more heightened than by the contemplation of the structure of the most gigantic animals." "We attach, and with reason," says Reaumur, "a kind of consequence to the knowledge of the faults and perfections of the productions in the fine arts, such as poetry, music, painting, sculpture, and architecture; but of the works of the Lord of nature, of this Master of masters, we scarcely think, or that there is any thing wonderful in their structure. There can indeed be no room for criticism, where there is nothing but what is admirable, and where the most perfect finite intelligences, the more they study such objects, the more they discover of their wonders. Yet this knowledge, so well calculated to elevate the mind, and lead it to the contemplation of the source from which all these wonders proceed, is regarded by many as frivolous, or of little importance. But he who looks upon an insect as merely a particle of moving wood, or putrid matter, and who has no idea of the marvellous organs of these minute animals, is in a state of ignorance far more gross and blameable, than the man who should confound the most finished productions in the fine arts, with the most rude and shapeless masses."

THE LOUSE.[1]

In examining the *human louse* with the microscope, its external deformity first strikes us with disgust; the shape of the fore part of the head is somewhat oblong; that of the hind part somewhat round; the skin is hard, and, being stretched, transparent, with here and there several bristly hairs; in the fore part is a proboscis or sucker, which is seldom visible; on each side of the head are antennæ or horns, each divided into five joints, covered with bristly hair; and several white vessels are seen through these horns; behind these are the eyes, which seem to want those divisions observable in other insects, and appear encompassed with some few hairs; the neck is very short, and the breast is divided into three parts; on each side of which are placed six legs, consisting of six joints covered also with bristly hairs; the ends of the legs are armed with two smaller and larger ruddy claws, serving those insects as a finger and thumb, by which they catch hold of such objects as they approach; the end of the body terminates in a cloven tail, while the sides are all over hairy; the whole resembling clear parchment, and, when roughly pressed, cracking with a noise.

When we take a closer view, its white veins, and other internal parts, appear; as likewise a most wonderful motion in its intestines, from the

[1] *Pediculus humanus*, Lin. The order *Parasita*, under which this genus comes, has six feet and no wings; abdomen destitute of articulated and moveable appendages; two or four small eyes; mouth in a great many, interior, presenting externally, either a snout or nipper, inclosing a retractile sucker, or two membranous lips with hooked mandibles.

transparency of its external covering. When the louse feeds, the blood is seen to rush, like a torrent, into the stomach; and its greediness is so great, that the excrements contained in the intestines are ejected at the same time, to make room for this new supply.

The louse has neither beak, teeth, nor any kind of mouth. In the place of all these, it has a proboscis or trunk; or, as it may be otherwise called, a pointed hollow sucker, with which it pierces the skin, and sucks the human blood, taking that for food only. The stomach is lodged partly in the breast and back; but the greatest portion of it is in the abdomen. When it is empty, it is colorless; but when filled, it is plainly discernible, and its motion seems very extraordinary. It then appears working with very strong agitations, and somewhat resembles an animal within an animal. Superficial observers are apt to take this for the pulsation of the heart; but if the animal be observed when it is sucking, it will be found that the food takes a direct passage from the trunk to the stomach, where the remainder of the old aliment will be seen mixing with the new, and agitated up and down on every side.

There is scarcely any animal that multiplies so fast as this unwelcome intruder. It has been pleasantly said, that a louse becomes a grandfather in the space of twenty-four hours. This fact cannot be ascertained; but nothing is more true than, that the moment the nit, which is no other than the egg of the louse, gets rid of its superfluous moisture, and throws off its shell, it then begins to breed in its turn. Nothing so much prevents the increase of this nauseous animal, as cold and want of humidity; the nits must be laid in a place that is warm, and moderately moist to produce any thing. That is the reason that many nits laid on the hairs in the night time, are destroyed by the cold of the succeeding day, and so stick for several months, till they at last come to lose even their external form. So numerous were the disgusting vermin in Mexico, that the ancient monarchs of that country endeavored to rid the subjects of them by imposing an annual tribute of a certain quantity. Bags full of lice were found in Montezuma's palace, by the Spanish invaders.

THE FLEA.[1]

If the flea be examined with a microscope, it will be observed to have a small head, large eyes, and a roundish body. It has two feelers, or horns, which are short, and composed of four joints; and between these lies its

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[1] *Pulex irritans*, Lin. The order *Syphonaptera*, under which this genus comes, has the body compressed; mouth with a sucker of two pieces, inclosed between two articulated laminæ, which united, form a rostrum or proboscis either cylindrical or conical, and of which the base is covered with scales.

trunk, which it buries in the skin, and through which it sucks the blood in large quantities. The body appears to be all over curiously adorned with a suit of polished sable armor, neatly joined, and beset with multitudes of snarp pins, almost like the quills of a porcupine. It has six legs, the joints

of which are so adapted, that it can, as it were, fold them up one within another; and when it leaps, they all spring out at once, whereby its whole strength is exerted, and the body raised above two hundred times its own diameter.

THE GLOW WORM.[1]

No two insects can differ more than the male and the female of this species from each other. The male is in every respect a beetle, having cases to its wings, and rising in the air at pleasure; the female, on the contrary, has none, but is entirely a creeping insect, and is obliged to wait the approaches of her capricious companion. The body of the female has eleven joints, with a shield breast-plate, the shape of which is oval; the head is placed over this, and is very small, and the three last joints of her body are of a yellowish color; but what distinguishes it from all other animals, is the shining light which it emits by night, and which is supposed by some philosophers to be an emanation which she sends forth to allure the male to her company.

THE BEETLE.[2]

Of the beetle there are various kinds; all, however, concurring in one common formation of having cases to their wings, which are the more

[1] *Lampyris noctiluca*, Lin.

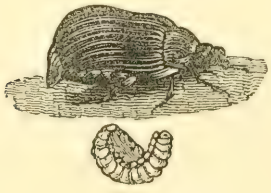
[2] The order *Coleoptera* has four wings, of which the two upper ones are in the form of cases; mandibles and jaws for mastication; under wings folded across; elytra crustaceous and the suture straight.

necessary to those insects, as they often live under the surface of the earth in holes which they dig out by their own industry. These cases prevent the various injuries their real wings might sustain by rubbing or crushing against the sides of their abode. These, though they do not assist in flight, yet keep the internal wings clean and even, and produce a loud buzzing noise when the animal rises in the air.

If we examine the formation of all animals of the beetle kind, we shall find, as in shell-fish, that their bones are placed externally, and their muscles within. These muscles are formed very much like those of quadrupeds, and are endued with such surprising strength, that, bulk for bulk, they are a thousand times stronger than those of a man. The strength of these muscles is of use in digging the animal's subterraneous abode, where it is most usually hatched, and to which it most frequently returns, even after it becomes a winged insect capable of flying.

Besides the difference which results from the shape and color of these animals, the size also makes a considerable one; some beetles being not larger than the head of the pin, while others, such as the elephant beetle, are as big as one's fist. But the greatest difference among them is, that some are produced in a month, and in a single season go through all the stages of their existence, while others take near four years to their production, and live as winged insects a year or more. To give the history of all these animals, that are bred pretty much in the same way, would be insipid and endless; it will suffice to select a few from the number, the origin of which may serve as specimens of the rest. We will therefore begin by offering the history of the may-bug to the reader's attention; premising, that most other beetles, though not so long lived, are bred in the same manner.

THE COCKCHAFER,[1]



MAY-BUG, or dor beetle, as some call it, has, like all the rest, a pair of cases to its wings, which are of a reddish brown color, sprinkled with a whitish

[1] *Melolontha vulgaris*, LIN.

dust, which easily comes off. In some years their necks are seen covered with a red plate, and in others with a black; these, however, are distinct sorts, and their difference is by no means accidental. The fore legs are very short, and the better calculated for burrowing in the ground, where this insect makes its retreat. It is well known to children by its evening buzz; but still more formidably introduced to the acquaintance of husbandmen and gardeners; for in some seasons it has been found to swarm in such numbers as to eat up every vegetable production.

The two sexes in the cockchafer are easily distinguished from each other by the superior length of the tufts, at the end of the horns, in the male.

In about three months after the eggs have been deposited in the earth, the contained insect begins to break its shell, and a small grub or maggot crawls forth, and feeds upon the roots of whatever vegetable it happens to be nearest. All substances of this kind seem equally grateful; yet it is probable the mother insect has a choice among what kind of vegetables she shall deposit her young. In this manner these voracious creatures continue in the worm state for more than three years, devouring the roots of every plant they approach, and making their way under ground in quest of food with great despatch and facility. They thus become one of the greatest nuisances of the farmer; as, when numerous, they will destroy whole fields of grass. At length, they grow to above the size of a walnut, being a great, thick, white maggot with a red head, which is seen most frequently in new turned earth, and which is so eagerly sought after by birds of every species.

When largest, they are found an inch and a half long, of a whitish yellow color, with a body consisting of twelve segments or joints, on each side of which there are nine breathing holes, and three red feet. The head is large in proportion to the body, of a reddish color, with a pincer before, and a semicircular lip, with which it cuts the roots of plants, and sucks out their moisture. As this insect lives entirely under ground, it has no occasion for eyes, and accordingly it is found to have none, but is furnished with two feelers, which, like the crutch of a blind man, serve to direct its motions. Such is the form of this animal, that lives for years in the worm state under ground, still voracious, and every year changing its skin.

It is not till the end of the fourth year that this extraordinary insect prepares to emerge from its subterraneous abode; and even this is not effected but by a tedious preparation.

Wherever an attentive observer then walks abroad, he will see them bursting up before him in his pathway, like ghosts on a theatre. He will see every part of the earth, that had its surface beaten into hardness, perforated by their egression. When the season is favorable for them, they are seen by thousands, buzzing along, hitting against every object that intercepts their flight. The mid-day sun, however, seems too powerful for their constitutions; they then lurk under the leaves and branches of some shady tree; but the willow seems particularly their most favorite food; there they

lurk in clusters, and seldom quit the tree till they have devoured all its verdure.

Their duration, however, is but short, as they never survive the season.

Of all the beetle kind this is the most numerous, and therefore deserves the chief attention of history. Like them, all other beetles are bred from the egg, which is deposited in the ground, or sometimes, though seldom, in the barks of trees; they change into a worm; they subsist in that state by living upon the roots of vegetables, or the succulent parts of the bark around them.

THE CANTHARIS[1]

Is of the beetle kind, whence come cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters. They have feelers like bristles, flexible cases to the wings, a breast pretty plain, and the sides of the belly wrinkled. Cantharides differ from each other in their size, shape, and color; those used in the shops also do the same. The largest in these parts are about an inch long, and as much in circumference; but others are not above three quarters of an inch. Some are of a pure azure color, others of pure gold, and others again have a mixture of pure gold and azure colors; but they are all very brilliant, and extremely beautiful. These insects, as is well known, are of the greatest benefit to mankind, making a part in various medicines conducive to human preservation. They are chiefly natives of Spain, Italy, and Portugal; but they are to be met with also about Paris in the summer time, upon the leaves of the ash, the poplar, and the rose-trees, and also among wheat, and in meadows.

THE TUMBLEDUNG[1]

Particularly demands our attention; it is all over of a dusky black, rounder than those animals are generally found to be, and so strong, though not much larger than the common black beetle, that if one of them be put under a brass candlestick, it will cause it to move backwards and forwards, as if it were by an invisible hand, to the admiration of those who are not accustomed to the sight; but this strength is given it for much more useful purposes than those of exciting human curiosity, for there is no creature more laborious, either in seeking subsistence, or in providing a proper retreat

[1] *Cantharis vesicatoria*, Lin. [2] *Ateuchus volvens*, Lin.

for its young. They are endowed with sagacity to discover subsistence by their excellent smelling, which directs them in flight to excrements just fallen from man or beast, on which they instantly drop, and fall unanimously to work in forming round balls or pellets thereof, in the middle of which they lay an egg. These pellets, in September, they convey three feet deep in the earth, where they lie till the approach of spring; when the eggs are hatched, the nest bursts, and the insects find their way out of the earth. They assist each other, with indefatigable industry, in rolling these globular pellets to the place where they are to be buried. This they perform with the tail foremost, by raising up their hinder part, and shoving along the ball with their hind feet. They are always accompanied with other beetles of a larger size, and of a more elegant structure and color. The breast of this is covered with a shield of a crimson color, and shining like metal; the head is of the like color, mixed with green, and on the crown of the head stands a shining black horn, bended backwards. These are called the kings of the beetles; but for what reason is uncertain, since they partake of the same dirty drudgery with the rest.

THE ELEPHANT BEETLE[1]

Is the largest of this kind hitherto known, and is found in South America, particularly Guiana and Surinam, as well as about the river Oroonoko. It is of a black color, and the whole body is covered with a very hard shell, full as thick and as strong as that of a small crab. Its length, from the hinder part of the eyes, is almost four inches, and from the same part to the end of the proboscis, or trunk, four inches and three quarters. The transverse diameter of the body is two inches and a quarter, and the breadth of each elytron, or case for the wings, is an inch and three tenths. The antennæ, or feelers, are quite horny; for which reason the proboscis, or trunk, is moveable at its insertion into the head, and seems to supply the place of feelers. The horns are eight tenths of an inch long, and terminate in points. The proboscis is an inch and a quarter long, and turns upwards, making a crooked line, terminating in two horns, each of which is near a quarter of an inch long; but they are not perforated at the end like the proboscis of other insects. About four tenths of an inch above the head, or that side next the body, is a prominence, or small horn, which, if the rest of the trunk were away, would cause this part to resemble the horn of a rhinoceros. There is indeed a beetle so called; but then the horn or trunk has no fork at the end, though the lower horns resemble this. The feet are all forked at the end, but not like the lobster's claws.

[1] *Scarabæus Hercules*, Lin.

THE GIGANTIC COCKROACH.[1]

The above insect is the largest of its species, and is almost the size of a hen's egg. It is a native and plague of the warm parts of Asia, Africa, and South America. This, and indeed all the other species of cockroaches, are a race of pestiferous beings, equally noisome and mischievous to natives or strangers. These filthy and voracious insects fly out in the evening, plunder and defile all kinds of victuals, dressed and undressed, and damage all sorts of clothing, every thing made of leather, books, paper, and various other articles. They fly into the flame of candles, and sometimes into the dishes; and they are very fond of ink and of oil, into which they are apt to fall and perish. In this case, they soon turn most offensively putrid, so that a man might as well sit over the putrid body of a large animal, as write with the ink in which they have died. They often fly into the faces or bosoms of persons, and their legs being armed with sharp spines, the pricking excites a sudden horror not easily repressed. In old houses they swarm by myriads, making indescribably nasty every part where they harbor, which in the day time is in dark corners, behind all sorts of clothes, in trunks, boxes, and in short every place where they can lie concealed. In old timber and deal houses, when the family is retired at night to sleep, this insect, among its other disagreeable properties, has the power of making a noise which very much resembles a pretty smart knocking with the knuckle upon wainscoting; in the West Indies, it is therefore frequently known by the name of the drummer.

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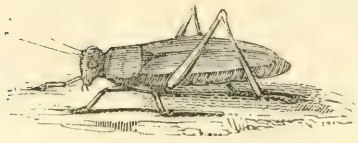
[1] *Blatta gigantea.* The order *Orthoptera*, to which this genus belongs, has elytra coriaceous, the margin of the one covering the margin of the other; mouth with mandibles; wings folded longitudinally, and sometimes behind transversely; metamorphosis semicomplete.

THE GRASSHOPPER.



That animal which is called the grasshopper with us, differs greatly from the cicada of antiquity; for, as our insect is active enough in hopping through the long grass, whence it has taken its name, the cicada had not this power, but either walked or flew. The little hissing note also of our grasshopper is very different from the song of the cicada, which was louder and far more musical.

Of this variegated tribe, the little grasshopper[1] that breeds in such plenty in every meadow, and that continues his chirping through the summer, is best known to us; and, by having its history, we shall be possessed of that of all the rest. This animal is of the color of green leaves, except a line of brown which streaks the back, and two pale lines under the belly, and behind the legs. It may be divided into the head, the corselet, and the belly. The head is oblong, regarding the earth, and bearing some resemblance to that of a horse. Its mouth is covered by a kind of round buckler jutting over it, and armed with teeth of a brown color, hooked at the points Within the mouth is perceivable a large reddish tongue, fixed to the lower jaw. The feelers, or horns, are very long, tapering on to a point, and the eyes are like two black specks, a little prominent. The corselet is elevated, narrow, armed above and below by two serrated spines. The back is armed with a strong buckler, to which the muscles of the legs are firmly bound and round these muscles are seen the vessels by which the animal breathes, as white as snow. The last pair of legs are much longer and stronger than the first two pair, fortified by thick muscles, and very well formed for leaping. It has four wings; the anterior ones springing from the second pair of legs, the posterior from the third pair. The hinder wings are much finer and more expansive than the foremost, and are the principal instruments of its flight. The belly is considerably large, composed of eight rings, and terminated by a forky tail, covered with down, like the tail of a rat. When examined internally, besides the gullet, we discover a small stomach; and behind that a very large one, wrinkled and furrowed withinside; lower down there is still a third; so that it is not without reason that all the

[1] *Acridium.*

animals of this order are said to chew the cud, as they so much resemble ruminating animals in their internal conformation.

A short time after the grasshopper assumes its wings, it fills the meadow with its note which, like that among birds, is a call to courtship. The male only of this tribe is vocal; and upon examining it at the base of the wings, there will be found a little hole in its body, covered with a fine transparent membrane. This is thought by Linnæus, to be the instrument it employs in singing; but others are of opinion, the sound is produced by rubbing its hinder legs against each other; however this may be, the note of one male is seldom heard, but it is returned by another; and the two little animals, after many mutual insults of this kind, are seen to meet and fight desperately. The female is generally the reward of victory; for, after the combat, the male seizes her with his teeth behind the neck, and thus keeps her for several hours.

Towards the latter end of autumn, the female prepares to deposit her burthen; and her body is then seen greatly distended with her eggs, which she carries to the number of a hundred and fifty. In order to make a proper lodgment in the earth for them, nature has furnished her with an instrument at her tail, somewhat resembling a two-edged sword, which she can sheathe and unsheathe at pleasure; with this she pierces the earth as deep as she is able; and into the hole which her instrument has made, she deposits her eggs, one after the other.

Having thus provided for the continuation of her posterity, the animal herself does not long survive; but, as the winter approaches, she dries up, seems to feel the effects of age, and dies from a total decay. Some, however, assert, that she is killed by the cold; and others, that she is eaten by worms; but certain it is, that neither male nor female are ever seen to survive the winter. In the mean time, the eggs which have been deposited continue unaltered, either by the severity of the season, or the retardation of the spring. They are of an oval figure, white, and of the consistence of horn; their size nearly equals that of a grain of anise; they are enveloped in the body within a covering, branched all over with veins and arteries; and when excluded they crack, on being pressed between the fingers; their substance within is a whitish, viscous, and transparent fluid.

Generally, about the beginning of May, every egg produces an insect, about the size of a flea. These at first are of a whitish color; at the end of two or three days they turn black; and soon after they become of a reddish brown. They appear, from the beginning, like grasshoppers wanting wings; and hop among the grass, as soon as excluded, with great agility.

Yet still they are by no means arrived at their state of full perfection; although they bear a strong resemblance to the animal in its perfect form. They want, or seem to want, the wings, which they are at last seen to assume; and can only hop among the grass, without being able to fly. The wings, however, are not wanting, but are concealed within four little

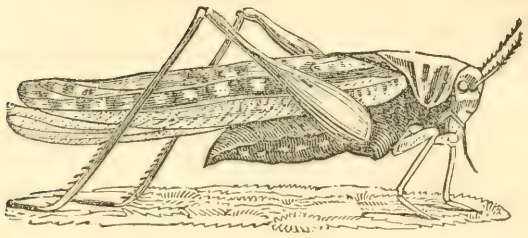
bunches, that seem to deform the sides of the animal; there they lie rolled up in a most curious manner, and occupying a smaller space than one could conceive. Indeed, all insects, whatever transmutations they seem to undergo, are yet brought forth with those very limbs, parts, and wings, which they afterwards seem to acquire. In the most helpless caterpillar, there are still to be seen the rudiments of that beautiful plumage which it afterwards expands when a butterfly; and though many new parts seem unfolded to the view, the animal acquires none but such as it was from the beginning possessed of.

The grasshopper, that for above twenty days from its exclusion, has continued without the use of its wings, which were folded up to its body, at length prepares for its emancipation, and for a life of greater liberty and pleasure. To make the proper dispositions for the approaching change, it ceases from its grassy food, and seeks about for a convenient place, beneath some thorn or thistle, that may protect it from an accidental shower. The same laborious writhings and workings, heavings and palpitations, which we have remarked in every other insect upon an approaching change, are exhibited in this.

At length, the skin covering the head and breast is seen dividing above the neck; the head is seen issuing out first from the bursting skin; the efforts still continuing, the other parts follow successively; so that the little animal with its long feelers, legs and all, works its way from the old skin, that remains fixed to the thistle or the thorn. It is, indeed, inconceiveable how the insect thus extricates itself from so exact a sheath as that which covered every part of its body.

The grasshopper, thus disengaged from its outer skin, appears in its perfect form; but then so feeble, and its body so soft and tender, that it may be moulded like wax. It is no longer of that obscure color which it exhibited before, but a greenish white, which becomes more vivid as the moisture on the surface is dried away. Still, however, the animal continues to show no signs of life, but appears quite spent and fatigued with its labor for more than an hour together. During this time, the body is drying, and the wings unfolding to their greatest expansion; and the curious observer will perceive them, fold after fold, opening to the sun, till at last they become longer than the two hinder legs. The insect's body also is lengthened during this operation, and it becomes much more beautiful than before.

THE LOCUST[1]



Is about three inches long, and has two horns, or feelers, an inch in length. The head and horns are of a brownish color; it is blue about the mouth, as also on the inside of the larger legs. The shield that covers the back is greenish; and the upper side of the body brown, spotted with black, and the under side purple. The upper wings are brown, with small dusky spots with one larger at the tips; the under wings are more transparent, and of a light brown, tinged with green; but there is a dark cloud of spots near the tips.

There is no animal in the creation that multiplies so fast as this, if the sun be warm, and the soil in which their eggs are deposited be dry.

The Scripture, which was written in a country where the locust made a distinguished feature in the picture of nature, has given us several very striking images of this animal's numbers and rapacity. It compares an army, where the numbers are almost infinite, to a swarm of locusts; it describes them as rising out of the earth, where they are produced; as pursuing a settled march to destroy the fruits of the earth, and co-operate with divine indignation.

When the locusts take the field, as we are assured, they have a leader at their head, whose flight they observe, and pay a strict attention to all his motions. They appear at a distance, like a black cloud, which, as it approaches, gathers upon the horizon, and almost hides the light of the day. It often happens, that the husbandman sees this imminent calamity pass away without doing him any mischief; and the whole swarm proceed onward to settle upon the labors of some less fortunate country. But wretched is the district upon which they settle; they ravage the meadow and the pasture ground; strip the trees of their leaves, and the garden of its beauty; the visitation of a few minutes destroys the expectations of a year; and a famine but too frequently ensues. In their native tropical climates, they are not so dreadful as in the southern parts of Europe. There, though the plain and the forest be stripped of their verdure, the power of vegetation is

[1] *Acridium migratorium*, LAT.

so great, that an interval of three or four days repairs the calamity; but in the north of Europe, the verdure is the livery of a season; and when lost, the inhabitants must wait till the ensuing spring repairs the damage. Besides, in their long flights to this part of the world, they are famished by the tediousness of their journey, and are therefore more voracious wherever they happen to settle. But it is not by what they devour that they do so much damage, as what they destroy. Their very bite is thought to contaminate the plant, and to prevent its vegetation. To use the expression of the husbandman, they burn whatever they touch, and leave the marks of their devastation for two or three years ensuing. But if they be noxious while living, they are still more so when dead; for wherever they fall, they infect the air in such a manner, that the smell is insupportable.

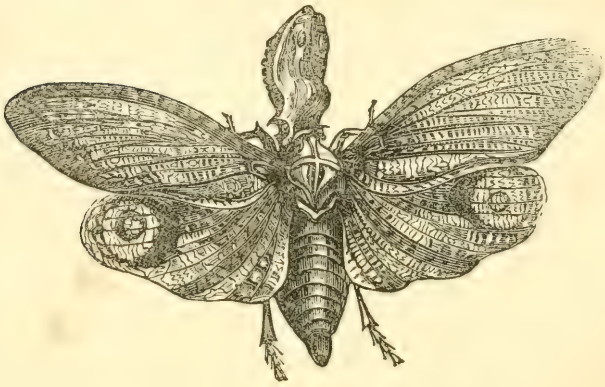
THE CRICKET[1]

Very much resembles the grasshopper in its shape, its manner of ruminating, its voice, its leaping, and methods of propagation. It differs in its color, which is uniformly of a rusty brown; in its food, which is more various; and in its place of residence, which is most usually in the warmest chinks behind a country hearth. They are, in some measure, obliged to the bad masonry employed in making peasants' houses for their retreats. The smallest chink serves to give them shelter, and where they once make their abode they are sure to propagate. They are of a most chilly nature, seldom leaving the fireside; and if undisturbed, are seen to hop from their retreats to chirp at the blaze in the chimney. The wood cricket is the most timorous animal in nature; but the chimney cricket, being used to noises, disregards them. Whether the voice of this animal is formed in the same manner with that of the grasshopper, is not yet ascertained; nor do we well know the use of this voice, since anatomical inspection has not been able to discover the smallest organs of hearing. Still, however, we can make no doubt of their power of distinguishing sounds, though probably not in the same manner with the more perfect ranks of nature. Certain it is, that they have been often heard to call, and this call is as regularly answered by another, although none but the males are vocal.

[1] *Gryllus domesticus*, Lin.

They are very voracious little animals, and will eat bread, flour, meat, and scummings of pots, but are particularly fond of sugar. They are a thirsty race, and show a great predilection for liquids, being often found drowned in pans of water, milk, or broth. Whatever is moist they affect, and therefore frequently gnaw holes in wet woolen stockings and aprons that are hung to the fire.

THE GREAT LANTERN FLY.[1]



This is undoubtedly one of the most curious of insects; it is of a very considerable size, measuring nearly three inches and a half from the tip of the front to that of the tail, and about five inches and a half from wing's end to wing's end, when expanded; the body is of a lengthened oval shape, roundish or subcylindric, and divided into several rings or segments; the length is nearly equal to the length of the rest of the animal, and is oval, inflated, and bent slightly upwards; the ground color is an elegant yellow, with a strong tinge of green in some parts, and marked with numerous bright red, brown variegations, in the form of stripes and spots; the wings are very large, of a yellow color, most elegantly varied with brown undulations and spots, and the lower pair are decorated by a very large eye-shaped spot on the middle of each, the iris or border of the spot being red, and the centre half red and half semi-transparent white; the head or lantern is pale

[1] *Fulgora laternaria*, Lin. The order *Hemiptera* has two wings covered by elytra; mouth formed for suction, the rostrum composed of a tubular articulated sheath, including four scaly setæ, in place of mandibles and jaws; elytra in some crustaceous, with the posterior extremity membranous; in others almost similar to wings, but more extended, thicker and colored.

yellow, with longitudinal red stripes. This beautiful insect is a native of Surinam and many other parts of South America, and during the night diffuses so strong a phosphoric splendor from its head or lantern, that it may be employed for the purpose of a candle or torch; and it is said that three or four of these insects tied to the top of a stick, are frequently used by travellers for that purpose. A single one gives light enough to enable a person to read.

THE COCHINEAL.[1]

This insect is of an oval form, of the size of a small pea, with six feet, and a snout or trunk. It brings forth its young alive, and is nourished by sucking the juice of the plant. Its body consists of several rings; and when it is once fixed on the plant, it continues immoveable, being subject to no change. Some pretend there are two sorts, the one domestic, which is best, and the other wild, that is, of a vivid color; however, they appear to be the same; with only this difference, that the wild feed upon uncultivated trees, without any assistance; whereas, the domestic is carefully, at a stated season, removed to cultivated trees, where it feeds upon a purer juice. Those who take care of these insects, place them on the prickly pear-plant, in a certain order, and are very industrious in defending them from other insects; for if any other kind comes among them, they take care to brush them off with foxes' tails. Towards the end of the year, when the rains and cold weather are coming on, which are fatal to these insects, they take off the leaves or branches, covered with the cochineal that have not attained their utmost degree of perfection, and keep them in their houses till winter is past. These leaves are very thick and juicy, and supply them with nourishment while they remain within doors. When the milder weather returns, and these animals are about to exclude their young, the natives make them nests, like those of birds, but less, of tree-moss, or soft hay, or the down of cocoa-nuts, placing twelve in every nest. These they fix on the thorns of the prickly pear-plant, and in three or four days' time they bring forth their young, which leave their nests in a few days, and creep upon the branches of the plant, till they find a proper place to rest in.

When the native Americans have gathered the cochineal, they put them into holes in the ground, where they kill them with boiling water, and afterwards dry them in the sun, or in an oven, or lay them upon hot plates. From the various methods of killing them, arise the different colors which they appear in, when brought to us. While they are living, they seem to be sprinkled over with a white powder, which they lose as soon as the boil

[1] *Coccus cacti*, Lin.

ing water is poured upon them. Those that are dried upon hot plates are the blackest. What we call the cochineal are only the females, for the males are a sort of fly. They are used both for dyeing and medicine, and are said to have much the same virtue as the kermes, though they are now seldom used alone, but are mixed with other things for the sake of the color.

TERMITES, OR WHITE ANTS.[1]

Of this curious insect, Mr Smeathman has given, in the Philosophical Transactions, so full and interesting an account, that we cannot do better than quote from it. "Of a great many curious parts of the creation, (says he,) which I met with in Guinea, the termites, or white ants, seemed most worthy of minute attention.

"The size and figure of their buildings have attracted the notice of many travellers, and yet the world has not hitherto been furnished with a tolerable description of them, though, when we come to consider the wonderful order of these insects, and of their subterraneous cities, they will appear foremost on the list of the wonders of the creation.

"These insects are known by various names. They belong to the termes of Linnæus, and other systematic naturalists.

"By the English, in the windward parts of Africa, they are called bugga bugs. In the West Indies, wood lice, wood ants, or white ants. By the French, at Senegal, vague vagues. In the West Indies, poux de bois, or fourmis blanches. By the Portuguese in the Brazils, coupée, or cutters, from their cutting things in pieces. By this latter name, and that of piercers or eaters, and similar terms, they are distinguished in various parts of the tropical regions.

"Of every species of the termites there are three orders; first, the working insects, which I shall call laborers; next, the fighting ones, or soldiers, which do no kind of labor; and, last of all, the winged ones, or perfect insects, which are male and female, and capable of propagation. These might very appositely be called the nobility or gentry, for they neither labor nor fight, being quite incapable of either, and almost of self-defence. These only are capable of being elected kings or queens; and nature has so ordered it, that they emigrate within a few weeks, after they are elevated to this state, and either establish new kingdoms, or perish within a day or two.

"The termes bellicosus, being the largest species, is best known on the coast of Africa. It erects immense buildings of well-tempered clay or earth,

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[1] The order of *Neuroptera* have four naked, reticulated, transparent wings; mouth proper for mastication; jaws and lips straight, extended; joints of the tarsi various, generally entire.

which are contrived with such art, that we are at a loss to say, whether they are most to be admired on that account, or for their enormous magnitude and solidity. They not only build larger and more curious nests, but are also more numerous, and do infinitely more mischief to mankind than other species. When these insects attack such things as we would not wish to have injured, we must consider them as most pernicious; but when they are employed in destroying decayed trees and substances which only encumber the surface of the earth, they may be justly supposed very useful. It is apparent to all, who have made observation, that they contribute more to the quick dissolution of putrescent matter than any other. They are so necessary in all hot climates, that even in the open fields, a dead animal or small putrid substance cannot be laid upon the ground two minutes, before it will be covered with flies and their maggots, which instantly entering quickly devour one part, and perforating the rest in various directions, expose the whole to be much sooner dissipated by the elements. In a few weeks, these insects destroy and carry away the bodies of large trees, without leaving a particle behind, thus clearing the place for other vegetables, which soon fill up every vacancy; and in places, where two or three years before, there has been a populous town, if the inhabitants, as is frequently the case, have chosen to abandon it, there shall be a very thick wood, and not the vestige of a post to be seen, unless the wood has been of a species which, from its hardness, is called iron wood.

"The nests of the termites bellicosi are so numerous all over the island of Bananas, and the adjacent continent of Africa, that it is scarce possible to stand upon any open place, where one of these buildings is not to be seen within fifty paces, and frequently two or three are to be seen almost close to each other. In some parts near Senegal, as mentioned by M. Adanson, their number, magnitude, and closeness of situation, make them appear like the villages of the natives. These buildings are usually termed hills, from their outward appearance, which is that of little hills more or less conical, and about ten or twelve feet in perpendicular height above the common surface of the ground.

"These hills continue quite bare until they are six or eight feet high; but, in time, the dead barren clay, of which they are composed, becomes fertilized by the genial power of the elements in these prolific climates; and in the second or third year, the hillock, if not overshaded by trees, becomes almost covered with grass and other plants; and in the dry season, when the herbage is burnt up by the rays of the sun, it is not much unlike a very large haycock.

"Every one of these buildings consists of two distinct parts, the exterior and the interior. The exterior is one large shell in the manner of a dome, large and strong enough to shelter the interior from the vicissitudes of the weather, and the inhabitants from the attacks of natural or accidental enemies. It is always, therefore, much stronger than the interior building,

which is the habitable part, divided with a wonderful kind of regularity and contrivance, into an amazing number of apartments for the residence of the king and queen, and the nursing of their numerous progeny; or for magazines, which are always found well filled with stores and provisions.

"These hills make their first appearance above ground by a little turret or two in the shape of sugar-loaves, which are run a foot high or more. Soon after, at some little distance, while the former are increasing in height and size, they raise others, and so go on increasing the number and widening them at the base, till their works below are covered with these turrets, which they always raise the highest and largest in the middle, and by filling up the intervals between each turret, collect them as it were into one dome. They are made very solid and strong, and when by the junction of them the dome is completed, for which purpose the turrets answer as scaffolds, they take away the middle ones entirely, except the tops (which joined together make the crown of the cupola,) and apply the clay to the building of the works within, or to erecting fresh turrets for the purpose of raising the hillock still higher; so that no doubt some part of the clay is used several times, like the boards and posts of a mason's scaffold.

"When these hills are at their full height, they answer excellently as places to look out. I have been with four men on the top of one of these hillocks. Whenever word was brought us of a vessel in sight, we immediately ran to some bugga bug hill, as they are called, and clambered up to get a good view, for upon the common surface it was seldom possible to see over the grass or plants.

"The interior parts of these buildings are disposed nearly as follows:

"The royal chamber, which I call so on account of its being occupied by the king and queen, is situated at about a level with the surface of the ground, at an equal distance from all the sides of the building, and directly under the apex of the hill.

"It is on all sides, both above and below, surrounded by what I should call the royal apartments, which have only laborers and soldiers in them, and can be intended for no other purpose than for these to wait in, either to guard or serve their common father and mother, on whose safety depends the happiness, and, according to the negroes, even the existence, of the whole community. These apartments compose an intricate labyrinth, which extends a foot or more in diameter from the royal chamber on every side. Here the nurseries and magazines of provisions begin, and, being separated by small empty chambers and galleries, which go round them or communicate from one to the other, are continued on all sides to the outward shell, and reach up within it two thirds or three fourths of its height, leaving an open area in the middle under the dome, which very much resembles the nave of an old cathedral: this is surrounded by three or four very large Gothic shaped arcnes, which are sometimes two or three feet high next the front of the area, but diminish very rapidly as they recede from thence like the arches

of aisles in perspective, and are soon lost among the innumerable chambers and nurseries behind them.

"All these chambers, and the passages leading to and from them, being arched, they help to support one another; and while the interior large arches prevent them falling into the centre, and keep the area open, the exterior building supports them on the outside.

"I have observed before, that there are of every species of termites three orders. Of these, the working insects, or laborers, are always the most numerous. In the termites bellicosus, there seem to be at least one hundred laborers to one of the fighting insects or soldiers. The laborers are about one fourth of an inch long, and twenty-five of them weigh about a grain; so that they are not so large as some of our ants. From their external habit and fondness for wood, they have been very expressively called wood lice. They resemble them, it is true, very much at a distance; but they run faster than any other insects of their size, and are incessantly bustling about their affairs.

"The second order, or soldiers, have a very different form from the laborers, and have been by some authors supposed to be the males, and the former neuters: but they are, in fact, the same insects as the foregoing, only they have undergone a change of form, and approach one degree nearer to the perfect state. They are now much larger, being half an inch long, and equal in bulk to fifteen of the laborers.

"There is now, likewise, a most remarkable circumstance in the form of the head and mouth; for in the former state, the mouth is evidently calculated for gnawing and holding bodies; but in this state, the jaws being shaped just like two very sharp awls a little jagged, they are incapable of any thing but piercing or wounding, for which purposes they are very effectual, being

as hard as a crab's claw, and placed in a strong, horny head, which is of a nut-brown color, and larger than all the rest of the body together, which seems to labor under great difficulty in carrying it: on which account, perhaps, the animal is incapable of climbing up perpendicular surfaces.

"The third order, or the insect in its perfect state, varies its form still more than ever. The head, thorax, and abdomen, differ almost entirely from the same parts in the laborers and soldiers; and, besides this, the animal is now furnished with four large, brownish, transparent wings, with which it is at the time of emigration to wing its way in search of a new settlement.

In short, it differs so much from its form and appearance in the other two states, that it has never been supposed to be the same animal, but by those

who have seen it in the same nests: and some of these have distrusted the evidence of their senses. It was so long before I met with them in their nests myself, that I doubted the information that was given me by the natives, that they belonged to the same family. Indeed we may open twenty nests without finding one winged one, for those are to be found only just before the commencement of the rainy season, when they undergo the last change, which is preparative to their colonization.

"In the winged state, they have also much altered their size as well as form. Their bodies now measure between six or seven tenths of an inch in length, and their wings above two inches and a half from tip to tip, and they are equal in bulk to about thirty laborers, or two soldiers. They are now also furnished with two large eyes placed on each side of the head, and very conspicuous. If they have any before, they are not easily to be distinguished. Probably in the two first states, their eyes, if they have any, may be small like those of moles; for as they live like these animals always under ground, they have as little occasion for these organs, and it is not to be wondered at that we do not discover them; but the case is much altered when they arrive at the winged state in which they are to roam, though but for a few hours, through the wide air, and explore new and distant regions. In this form the animal comes abroad during or soon after the first tornado, which, at the latter end of the dry season proclaims the approach of the ensuing rains, and seldom waits for a second or third shower, if the first, as is generally the case, happens in the night, and brings much wet after it. The quantities that are to be found the next morning all over the surface of the earth, but particularly on the waters, is astonishing; for their wings are only calculated to carry them a few hours, and after the rising of the sun not one in a thousand is to be found with four wings, unless the morning continues rainy, when here and there a solitary being is seen winging its way from one place to another, as if solicitous only to avoid its numerous enemies, particularly various species of ants which are hunting on every spray, on every leaf, and in every possible place, for this unhappy race, of which probably not a pair in many millions get into a place of safety, fulfil the first law of nature, and lay the foundation of a new community.

"Not only all kinds of ants, birds, and carnivorous reptiles, as well as insects, are upon the hunt for them, but the inhabitants of many countries, and particularly of that part of Africa where I was, eat them. At the time of swarming, or rather of emigration, they fall into the neighboring waters, when the Africans skim them off with calabashes, bring large kettles full of them to their habitations, and parch them in iron pots over a gentle fire, stirring them about as is usually done in roasting coffee. In that state, without sauce or any other addition, they serve them as delicious food; and they put them by handsfull into their mouths, as we do comfits. I have eaten them dressed this way several times, and think them both delicate, nourishing, and wholesome; they are something sweeter, but not so fat and cloying as the caterpillar or maggot of the palm tree, snout-beetle, curculio palmarum, which is served up at all the luxurious tables of West Indian epicures, particularly of the French, as the greatest dainty of the western world."

THE GALL INSECTS[1]

Are bred in a sort of bodies adhering to a kind of oak in Asia, which differ with regard to their color, size, roughness, smoothness, and shape, and which we call galls. They are not fruit, as some have imagined, but preternatural tumors, owing to the wounds given to the buds, leaves, and twigs of the tree, by a kind of insect that lays its eggs within them. This animal is furnished with an implement, by which the female penetrates into the bark of the tree, or into that spot which just begins to bud, and there sheds a drop of corrosive fluid into the cavity. Having thus formed a receptacle for her eggs, she deposits them in the place, and dies soon after.

The juice or sap of the plant, thus turned back from its natural course, extravasates and flows round the egg; after which it swells and dilates by the assistance of some bubbles of air, which get admission through the pores of the bark, and which run in the vessels with the sap.

This little ball receives its nutriment, growth, and vegetation, as the other parts of the tree, by slow degrees, and is what we call the gall-nut. The worm that is hatched under this spacious vault, finds in the substance of the ball, which as yet is very tender, a subsistence suitable to its nature; gnaws and digests it till the time comes for its transformation to a nymph, or chrysalis, and from that state of existence changes into a fly. After this the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air. The

[1] *Cynipidæ*. The order *Hymenoptera* has four naked veined wings of unequal size; mouth composed of jaws, mandibles, and two lips; lip tubular at its base, terminated by a labium, either doubled or folded in, and forming a kind of sucker; females with a compound ovipositor, or sting at the anus.

case, nowever, is not similar with respect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its enclosure. The nut falls with the leaves, and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny of the nut is well stopped up; and lies buried, as it were, under a heap of leaves, which preserve it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient, since at this time the fly is but a diminutive creature. Besides, the ringlets whereof its body is composed, dilate, and become pliant in the passage.

THE ANT.

The common ants of Europe[1] are of two or three different kinds; some red, some black, some with stings, and others without. Such as have stings inflict their wounds in that manner; such as are unprovided with these weapons of defence have a power of spurting, from their hinder parts, an acid, pungent liquor, which, if it lights upon the skin, inflames and burns it like nettles.

The body of an ant is divided into the head, breast, and belly. In the head the eyes are placed, which are entirely black, and under the eyes there are two small horns, or feelers, composed of twelve joints, all covered with a fine silky hair. The mouth is furnished with two crooked jaws, which project outwards, in each of which are seen incisors, that look like teeth. The breast is covered with a fine silky hair, from which project six legs, that are pretty strong and hairy; the extremities of each armed with two small claws, which the animal uses in climbing. The belly is more reddish than the rest of the body, which is of a brown chesnut color, shining as a glass, and covered with extremely fine hair.

As soon as the winter is past, on the first fine day in April, the ant-hill, that before seemed a desert, now swarms with new life, and myriads of these insects are seen just awaked from their annual lethargy, and preparing for the pleasures and fatigues of the season. For the first day they never offer to leave the hill, which may be considered as their citadel, but run over every part of it, as if to examine its present situation, to observe what injuries it has sustained during the rigors of winter, while they slept, and to meditate and settle the labors of the day ensuing.

[1] *Formicariæ.*

At the first display of their forces, none but the wingless tribe appears, while those furnished with wings remain at the bottom. These are the working ants, that first appear, and that are always destitute of wings; the males and females, that are furnished with four large wings each, are more slow in making their appearance.

Thus, like bees, they are divided into males and females, and the neutral or working tribe. These are all easily distinguished from each other; the females are much larger than the males; the working ants are the smallest of all. The two former have wings, which, however, they sometimes are divested of; the latter never have any, and upon them are devolved all the labors that tend to the welfare of the community. The female also may be distinguished by the color and structure of her breast, which is a little more brown than that of the common ant, and a little brighter than that of the male.

The neuters exercise all the ordinary offices necessary for the existence and welfare of the community to which they belong; it is they who collect supplies of food, who explore the country for this purpose, and seize upon every animal substance, whether living or dead, which they can lay hold of, and transport to the common abode of the tribe. It is they who construct every part of the dwelling place, who attend the hatching of the eggs, the feeding of the larvæ, and their removal to different situations, as occasion may require, and who conduct all the operations both of offensive and defensive warfare; in fact, all the laborious and perilous duties of this singular commonwealth. There is every reason, however, to believe that the helots and females of this tribe of insects are originally and substantially of the same sex, and that the developement of the sexual organs in the latter is the consequence of some difference in the circumstances in which the larva is placed during its growth. In all the features of internal structure, the supposed neuters agree with the female, and in the number of articulations composing the antennæ. Thus we find thirteen in the male, twelve only in the female, and twelve in the neuter. In the male ant, the abdomen has seven rings, in the female and neuter only six. In the two latter classes, the head is broader, and the mandibles very large and powerful, compared with those of the male, and furnished with serrated edges, and a sharp and often hooked point. The external sexual organs of the female and of the neuter are so nearly similar in appearance, that Latreille declares that he was unable to perceive the least difference between them. On the other hand, it is to be observed, that in the neuter the principal deviation from the model of the female consists in the absence of wings; a circumstance which may be conceived to be connected with a certain condition of the sexual organs, as are the horns of deer and the beard of men.

Ants certainly possess a greater share of muscular strength, than almost any other insect of the same size. Of this we are witnesses from childhood in the incessant toil which they undergo, and the great loads they are seen

to carry, often exceeding ten or twelve times their own weight. This apparently is connected with a corresponding share of sensation, seen in their great susceptibility to all changes of temperature, to moisture, and other conditions of the atmosphere. In the perfection of their sight they are also remarkable; the males and females being provided with both the descriptions of eyes peculiar to this class, namely, the composite and the simple eyes. The laboring ants, indeed, who never fly, are frequently destitute of the latter kind.

Many erroneous opinions are prevalent with regard to the food of ants, which have often been supposed to consume corn, and to do great injury to plants by devouring their roots or stems. The truth is, that they are chiefly carnivorous insects, preying indiscriminately on all the softer parts of animals, and especially the viscera of other insects, whom they will often attack when alive, and overpower by dint of numbers, upon which they devour their victim on the spot, or drag him prisoner into their nests; or if the game should be too bulky to be easily transported, they make a plentiful meal, and exert like the bee a power of disgorging a portion, and of imparting it to their companions at home. It appears that they are even able to retain at pleasure the nutritious juices unchanged for a considerable time. The rapidity with which they consume, and in fact anatomize, the carcasses of any small bird or quadruped that happens to fall in their way, is well known, and furnishes an easy method of obtaining natural skeletons of these animals, by placing their dead bodies in the vicinity of a populous ant-hill. In hot climates, where they multiply to an amazing extent, their voracity and boldness increase with their numbers. Bosman, in his description of Guinea, states that in one night they will devour a sheep, leaving it a fine skeleton; while a fowl is for them only the amusement of an hour. In these situations they will venture to attack even living animals of considerable size. Rats and mice often become their victims. The sugar ants of Grenada cleared every plantation which they visited of rats and other vermin, which they probably effected by attacking their young. Poultry, or other small stock, could not be raised without the greatest difficulty; and the eyes, nose, and other emunctories of the bodies of dying or dead animals were instantly covered with them.

The fecundation of the ant is effected very generally during the flight of the females, in which they are accompanied by the males; both appearing to be provided with wings chiefly for this object. A certain number of impregnated females are also, by the assistance of their wings, enabled to reach distant situations, where they become respectively the founders of new colonies; while the males, having fulfilled the office for which nature had destined them, are left to perish on the spot where they descend, being removed from those who formerly administered to them food, and being destitute of the means of procuring subsistence for themselves. Swarms of ants, of immense size, are occasionally met with; some have been recorded of such

prodigious magnitude as to darken the air like a thick cloud, and to cover the ground where they settled to a considerable extent.

THE WASP[1]

Is well known to be a winged insect with a sting; to be longer in proportion to its bulk than the bee; to be marked with bright yellow circles round its body; and to be the most swift and active insect of all the fly kind. On each side of the mouth, this animal is furnished with a long tooth, notched like a saw, and with these it is enabled to cut any substance, not omitting meat itself, and to carry it to its nest. Wasps live like bees in community, and sometimes ten or twelve thousand are found inhabiting a single nest.

Of all insects, the wasp is the most fierce, voracious, and most dangerous, when enraged. They are seen wherever flesh is cutting up, gorging themselves with the spoil, and then flying to their nests with their reeking prey. They make war also on every other fly, and the spider himself dreads their approaches.

Every community among bees is composed of females or queens, drones or males, and neutral or working bees. Wasps have similar occupations; the two first are for propagating the species, the last for nursing, defending, and supporting the rising progeny. Among bees, however, there is seldom above a queen or two in a hive; among wasps there are above two or three hundred.

As soon as the summer begins to invigorate the insect tribes, the wasps are the most of the number, and are diligently employed either in providing provisions for their nest, if already made, or in making one, if the former habitation be too small to receive the increasing community. The nest is one of the most curious objects in natural history, and contrived almost as artificially as that of the bees themselves. Their principal care is to seek out a hole that has been begun by some other animal, a field mouse, a rat, or a mole, to build their nests in. They sometimes build upon the plain, where they are sure of the dryness of their situation; but most commonly

[1] *Vespa vulgaris*, Lin.

on the side of a bank, to avoid the rain or water that would otherwise annoy them. When they have chosen a proper place, they go to work with wonderful assiduity. Their first labor is to enlarge and widen the hole, taking away the earth, and carrying it off to some distance. To prevent the earth from falling down and crushing their rising city into ruin, they make a sort of roof with their gluey substance, to which they begin to fix the rudiments of their building, working from the top downwards, as if they were hanging a bell, which, however, at length, they close up at the bottom. The materials with which they build their nests, are bits of wood and glue. The wood they get where they can, from the rails and posts which they meet with in the fields, and elsewhere. These they saw and divide into a multitude of small fibres, of which they take up little bundles in their claws, letting fall upon them a few drops of gluey matter, with which their bodies are provided, by the help of which they knead the whole composition into a paste, which serves them in their future building. When they have returned with this to the nest, they stick their load of paste on that part where they make their walls and partitions; they tread it close with their feet, and trowel it with their trunks, still going backwards as they work. Having repeated this operation three or four times, the composition is at length flatted out until it becomes a small leaf of a gray color, much finer than paper, and of a pretty firm texture. This done, the same wasp returns to the field to collect a second load of paste, repeating the same several times, placing layer upon layer, and strengthening every partition in proportion to the wants or convenience of the general fabric. Other working wasps come quickly after to repeat the same operation, laying more leaves upon the former, till at length, after much toil, they have finished the large roof which is to secure them from the tumbling in of the earth. This dome being finished, they make another entrance to their habitation, designed either for letting in the warmth of the sun, or for escaping in case one door be invaded by plunderers. Certain, however, it is, that by one of these they always enter, by the other they sally forth to their toil; each hole being so small that they can pass but one at a time. The walls being thus composed, and the whole somewhat of the shape of a pear, they labor at their cells, which they compose of the same paper-like substance that goes to the formation of the outside works. Their combs differ from those of bees, not less in the composition than the position which they are always seen to retain. The honeycomb of the bee is edgewise with respect to the hive; that of the wasp is flat, and the mouth of every cell opens downwards. Thus is their habitation contrived story above story, supported by several rows of pillars which give firmness to the whole building, while the upper story is flat-roofed, and as smooth as the pavement of a room laid with squares of marble. The wasps can freely walk upon these stories between the pillars to do whatever their wants require. The pillars are very hard and compact being larger at each end than in the middle, not much unlike the columns

of a building. All the cells of the nests are only destined for the reception of the young, being replete with neither wax nor honey.

Each cell is, like that of the bee, hexagonal; but there are two sorts, the one larger, for the production of the male and the female wasps, the other less, for the reception of the working part of the community. When the females are impregnated by the males, they lay their eggs one in each cell, and stick it in with a kind of gummy matter to prevent its falling out. From this egg proceeds the insect in its worm state, of which the old ones are extremely careful. But the wasp community differs from that of the bee in this; that among the latter, the working bees take the parental duties upon them, whereas, among the wasps, the females alone are permitted to feed their young, and to nurse their rising progeny. For this purpose the female waits with great patience till the working wasps have brought in their provisions, which she takes from them, and cuts into pieces. She then goes with great composure from cell to cell, and feeds every young one with her mouth. When the young worms have come to a certain size, they leave off eating, and begin to spin a very fine silk, fixing the first end to the entrance of the cell; then turning their heads, first on one side, then on the other, they fix the thread to different parts, and thus they make a sort of door which serves to close up the mouth of the cell. After this, they divest themselves of their skins after the usual mode of transformation; the aurelia by degrees begins to emancipate itself from its shell; by little and little it thrusts out its legs and wings, and insensibly acquires the color and shape of its parent.

THE HORNET[1]

is one of the largest and most remarkable species of the wasp. It is twice as large as the common wasp, and is also distinguished by a black breast,

[1] *Vespa crabro*, Lin.

and double black spots on the belly; the head is also longer and slenderer and the eyes somewhat resembling a half moon. It is extremely bold and venomous. Its predominant passion is for flesh, and, when hungry, two or three of them will seize upon a small bird, kill it, and devour its flesh. Nay, it has even been said, that singly, it will attack and conquer a sparrow.

THE BEE.[1]

Queen. Working Bee. Drone.

The domestic bee differs in a variety of particulars from most other animals, and admits a threefold description, under its various characters of *queen bee*, *drone bee*, and *working bee;* for though this last kind is, strictly speaking, the only honey bee, yet as all the three kinds are found, and seem to be necessary, in every community or hive of bees, they go under the same general name of *apis mellifica*, while at the same time they differ so much from each other, (more indeed than some different species of the same genus of other animals,) that a particular and separate description of each is necessary. The drones may easily be distinguished from the common or working bees. They are both larger and longer in the body. Their heads are round, their eyes full, and their tongues short. The form of the belly differs from those of both queen and common bees; and their color is darker than either. They have no sting, and they make a much greater noise when flying than either the queen or the common bees; a peculiarity of itself sufficient to distinguish them. Other writers on this subject have asserted, that the dissection of the drone gives as great proof of its being the male, as that of the queen does of her being female.

The queen is easily distinguished from all the other bees in the hive, by the form, size, and color of her body. She is considerably longer, and her wings are much shorter, in proportion to her body, than those of the other bees. The wings of both common bees and drones cover their whole bodies, whereas those of the queen scarcely reach beyond the middle, ending about the third ring of the belly. Her hinder part is far more tapering than those of the other bees; her belly or legs are yellower, and her upper parts of a

[1] *Apis mellifica*, Lin.

much darker color than theirs. She is also furnished with a sting, though some authors assert that she has none, having been induced to form this opinion because she is extremely pacific; so much so indeed, that one may handle her, and even tease her as much as he pleases, without provoking her resentment. The omniscient Governor of nature has wisely ordained this majestic insect to be of a pacific disposition; for, were she otherwise, were she like the other bees, of so irritable a temper as to draw her sting on every occasion, and to leave it in the body of her antagonist, it would prove of dangerous and often fatal consequence to the whole hive; for every bee, after losing her sting, dies within a day or two at the utmost. The queen bee is solemn and calm in her deportment. A young queen is a great deal smaller in size than a full-grown one; being not much longer than a common bee, and is therefore not so easily observed when sought for. When only three or four days old, she is very quick in her motions, and runs very fast; but when pregnant with eggs, she becomes very large, and her body is heavy.

The working or common bee is smaller than either the queen or the drone bee; and, as well as these, consists of three parts, viz. the head, which is attached by a narrow kind of neck to the rest of the body; the breast or middle part; and the belly, which is nearly separated from the breast by an insection or division, and connected with it by another narrow neck or junction. There are two eyes in the head, of an oblong figure, black, transparent, and immoveable. The mouth and jaws, like those of some species of fish, open to the right and left, and serve instead of hands, to carry out of the hive whatever encumbers or offends them. In the mouth there is a long proboscis, or trunk, with which the bees suck up the sweets from the flowers. They have four wings fastened to their middle part, by which they are not only enabled to fly with heavy loads, but also to make those well known sounds and hummings to each other that are supposed to be their only form of speech. They have also six legs fastened to their middle. The two foremost of these are the shortest, and with these they unload themselves of their treasures. The two in the middle are somewhat longer; and the two last are longest. On the outside of the middle joint of these last, there is a small cavity in the form of a narrow spoon, in which the bees collect by degrees those loads of wax they carry home to their hives. This hollow groove is peculiar to the working bee. Neither the queen nor the drones have any resemblance of it. The tibiæ of the hind legs are ciliated, and transversely streaked on the inside. Each foot terminates in two hooks, with their points opposite to each other; in the middle of these hooks there is a little thin appendix, which, when unfolded, enables the insects to fasten themselves to glass, or the most polished bodies. This part they likewise employ for transmitting the small particles of crude wax, which they find upon flowers, to the cavity in their thighs. The belly is ornamented with six rings; and contains, besides the intestines, the honey-bladder, the venom-

bladder, and the sting. The honey-bladder is a reservoir, into which is deposited the honey that the bee sips from the cups of the flowers after it has passed through the proboscis, and through the narrow pipes that connect the head, breast, and belly of the bee. This bladder, when full, is of the size of a small pea, and is so transparent, that the color of the honey can be distinguished through it. The sting is situated at the extremity of the belly, and the head or root of it is placed contiguous to the small bladder that contains the venom, connected to the belly by certain small muscles, by means of which the bee can dart it out and draw it in with great force and quickness. In length it is about the sixth part of an inch. These working bees may be said to compose the whole community, except in the season of the drones, which hardly lasts three months. During all the other nine months, there are no other bees in the hive except them and the queen. The whole labor of the hive is performed by them. They build the combs, collect the honey, bring it home, and store it up in their waxen magazines. They rear up the eggs to produce young queens, common bees, and drones; they carry out all incumbrances that are in the hives; they defend the community against enemies of every kind, and kill all the drones.

When the bees begin to work in their hives, they divide themselves into four companies; one of which roves in the fields in search of materials; another employs itself in laying out the bottom and partitions of their cells; a third is employed in making the inside smooth from the corners and angles; and the fourth company brings food for the rest, or relieves those who return with their respective burdens. But they are not kept constant to one employment; they often change the tasks assigned them; those that have been at work being permitted to go abroad, and those that have been in the fields already take their places. They seem even to have signs by which they understand each other; for when any of them want food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time open to receive it.

Honey is originally a juice digested in plants, which sweats through their pores, and chiefly in their flowers, or is contained in reservoirs in which nature stores it. The bees sometimes penetrate into these stores, and at other times find the liquor exuded. This they collect in their stomachs; so that, when loaded with it, they seem, to an attentive eye, to come home without any booty at all. Besides the liquor already mentioned, which is obtained from the flowers of plants, another substance, called honey dew, has been discovered, of which the bees are equally fond. From whatever source the bees have collected their honey, the instant they return home, they seek cells in which they may disgorge and deposit their loads. They have two sorts of stores; one of which consists of honey laid up for the winter, and the other of honey intended for accidental use in case of bad weather, and for such bees as do not go abroad in search of it. Their method of securing each of

these is different. They have in each cell a thicker substance, which is placed over the honey to prevent its running out of the cell; and that substance is raised gradually as the cell is filled, till the bees, finding that the cell cannot contain any more, close it with a covering of wax, not to be opened till times of want, during the winter.

When a hive is become too much crowded by the addition of the young brood, a part of the bees think of finding themselves a more commodious nabitation, and with that view single out the most forward of the young queens. A new swarm is, therefore, constantly composed of one queen at least, and of several thousand working bees, as well as of some hundreds of drones. The working bees are some old, some young. Scarce has the colony arrived at its new habitation, when the working bees labor with the utmost diligence to procure materials for food and building. Their principal aim is not only to have cells in which to deposit their honey, but a stronger motive seems to animate them; they seem to know that their queen is in haste to lay her eggs. Their industry is such, that in twenty-four hours they will have made combs twenty inches long, and wide in proportion. They make more wax, during the first fortnight, if the season is favorable, than they do during all the rest of the year. Other bees are at the same time busy in stopping all the holes and crevices they find in the new hive, in order to guard against the entrance of insects which covet their honey, their wax or themselves; and also to exclude the cold air; for it is indispensably necessary that they be lodged warm. When the bees first settle in swarming; indeed, when they at any time rest themselves, there is something very particular in the method of taking their repose. It is done by collecting themselves in a heap, and hanging to each other by their feet. They sometimes extend these heaps to a considerable length. It would seem probable to us, that the bees from which the others hang must have a considerable weight suspended to them. All that can be said is, that the bees must find this to be a situation agreeable to themselves. They, perhaps, have a method of distending themselves with the air, thereby to lessen their specific gravity; as fishes do, to alter their gravity compared with water. When a swarm divides into two or more bands, which settle separately, this division is a sure sign that there are two or more queens among them. One of these clusters is generally larger than the other. The bees of the smaller cluster, or clusters, detach themselves by little and little, till at last the whole, together with the queen, or queens, unite with the larger cluster. As soon as the bees are settled, the supernumerary queen or queens must be sacrificed to the peace and tranquillity of the hive. This execution generally raises a considerable commotion in the hive; and several other bees, as well as the queen or queens, lose their lives. Their bodies may be observed on the ground near the hive. The queen that is chosen is of a more reddish color than those which are destroyed; so that fruitfulness seems to be a great mo

tive of preference in bees; for the nearer they are to the time of laying their eggs, the bigger, redder and more shining are their bodies.

The balls which we see attached to the legs of bees returning to the hives, are not wax, but a powder collected from the stamina of flowers, not yet brought to the state of wax. The substance of these balls, heated in any vessel, does not melt as wax would do, but becomes dry, and hardens; it may even be reduced to a coal. If thrown into water it will sink, whereas wax swims. To reduce this crude substance into wax, it must first be digested in the body of the bee. Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantity of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and quickly becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads it into two little balls. In the thighs of the hinder legs there are two cavities edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flits from flower to flower, increasing its store, and adding to its stock of wax, until the ball on each thigh becomes as big as a grain of pepper; by this time having got a sufficient load, it returns, making the best of its way to the hive. After the bees have brought home this crude substance, they eat it by degrees; or, at other times, three or four bees come and ease the loaded bee, by eating each of them a share, the loaded bee giving them a hint so to do. Hunger is not the motive of their thus eating the balls of waxy matter, especially when a swarm is first hived; but it is their desire to provide a speedy supply of real wax for making the combs. At other times, when there is no immediate want of wax, the bees lay this matter up in repositories to keep it in store. When this waxy matter is swallowed, it is by the digestive powers of the bee converted into real wax, which the bees again disgorge as they work it up into combs; for it is only while thus soft and pliant from the stomach, that they can fabricate it properly. That the wax thus employed is taken from their stomach, appears from their making a considerable quantity of comb soon after they are hived, and even on any tree or shrub where they have rested but a short while before their being hived; though no balls were visible on their legs, excepting those of a few which may be just returned from the field. This is farther confirmed by what happened in a swarm newly hived; for two days together, from the time of their quitting their former home, it rained constantly, insomuch that not one bee was able to stir out during that time; yet, at the end of two days, they had made a comb fifteen or sixteen inches long, and thick in proportion. The crude wax, when brought home to the bees, is often of as different colors as are the flowers from which it is collected; but the new combs are always of a white color, which is afterwards changed only by the impurities arising from the steam, &c., of the bees. Bees collect crude wax, also, for food; for, if this was not the case, there would be no want of

wax after the combs are made; but they are observed, even in old hives, to return in great numbers loaded with such matter, which is deposited in particular cells, and is known by the name of bee-bread.

When a queen is removed from a hive, the bees do not immediately perceive it; they continue their labors, "watch over their young, and perform all their ordinary occupations. But, in a few hours, agitation ensues; all appears a scene of tumult in the hive: a singular humming is heard; the bees desert their young, and rush over the surface of the combs with a delirious impetuosity." They have now evidently discovered that their sovereign is gone; and the rapidity with which the bad news spreads through the hive, to the opposite side of the combs, is very remarkable. On replacing the queen in the hive, tranquillity is almost instantly restored. The bees, it is worthy of notice, recognise the individual person of their own queen. If another be palmed upon them, they seize and surround her, so that she is either suffocated or perishes by hunger; for it is very remarkable, that the workers are never known to attack a queen bee with their stings. If, however, more than eighteen hours have elapsed before the stranger queen be introduced, she has some chance to escape; the bees at first seize and confine her; but less rigidly; and they soon begin to disperse, and at length leave her to reign over a hive in which she was at first treated as a prisoner. If twenty-four hours have elapsed, the stranger will be well received from the first, and at once admitted to the sovereignty of the hive. In short, it appears that the bees, when deprived of their queen, are thrown into great agitation; that they wait about twenty hours, apparently in hopes of her return; but that, after this interregnum, the agitation ceases; and they set about supplying their loss by beginning to construct royal cells. It is when they are in this temper, and not sooner, that a stranger queen will be graciously received; and upon her being presented to them, the royal cells, in whatever state of forwardness they may happen to be, are instantly abandoned, and the larvæ destroyed. Reaumur must, therefore, have mistaken the result of his own experiments, when he asserts, that a stranger queen is instantly well received, though presented at the moment when the other is withdrawn. He had seen the bees crowding round her at the entrance of the hive, and laying their antennæ over her; and this he seems to have taken for caressing. The structure of the hives he employed prevented him from seeing further; had he used the leaf-hive, or one of similar construction, he would have perceived that the apparent caresses of the guards were only the prelude of actual imprisonment.

After the season of swarming, it is well known, a general massacre of the drones is commenced Several authors assert that the workers do not sting the drones to death, but merely harass them till they be banished from the hive and perish. M. Huber contrived a glass table, on which he placed several hives, and he was thus able to see distinctly what passed in the bot-

tom of the hive, which is generally dark and concealed; he witnessed a real and furious massacre of the males, the workers thrusting their stings so deep into the bodies of the defenceless drones, that they were obliged to turn on themselves as on a pivot, before they could extricate them. The work of death commenced in all the hives much about the same time. It is not, however, by a blind or indiscriminating instinct that the workers are impelled thus to sacrifice the males; for if a hive be deprived of its queen, no such massacre takes place in it, but the males are allowed to survive the winter.

A farm, or a country, may be overstocked with bees, as with any sort of animal; for a certain number of hives always require a certain number of flowers to subsist on. When the flowers near home are rifled, then are these industrious insects seen taking more extensive ranges, but their abilities may be overtaxed; and if they are obliged, in quest of honey, to go too far from home, they are overwearied in the pursuit, they are devoured by birds, or beaten down by the winds and rain.

From a knowledge of this, in some parts of France and Piedmont, they have contrived a kind of floating bee-house. They have on board one barge threescore or a hundred bee-hives, well defended from the inclemency of an accidental storm; and with these, the owners suffer themselves to float gently down the river. As the bees are continually choosing their flowery pasture along the banks of the stream, they are furnished with sweets before unrifled; and thus a single floating bee-house yields the proprietor a considerable income.

The bees are nearly alike in all parts of the world, yet there are differences worthy our notice. In Guadaloupe, the bee is less by one half than the European, and more black and round. They have no sting, and make their cells in hollow trees, where, if the hole they meet with is too large, they form a sort of waxen house, of the shape of a pear, and in this they lodge and store their honey, and lay their eggs. They lay up their honey in waxen vessels of the size of a pigeon's egg, of a black or deep violet color; and these are so joined together, that there is no space left between them.

The honey never congeals, but is fluid, of the consistence of oil, and the color of amber. Resembling these, there are found little black bees, without a sting, in all the tropical climates; and though these countries are replete with bees, like our own, yet those form the most useful and laborious tribe in that part of the world. The honey they produce is neither so unpalatable, nor so surfeiting as ours; and the wax is so soft, that it is only used for medicinal purposes, it being never found hard enough to form into candles, as in Europe.

Of insects that receive the name of bees, among us, there are several; which however differ very widely from that industrious social race we have

just been describing. The humble bee[1] is the largest of all this tribe, being as large as the first joint of one's middle finger. These are seen in every field, and perched on every flower. They build their nest in holes in the ground, of dry leaves, mixed with wax and wool, defended with moss from the weather. Each humble bee makes a separate cell, about the size of a small nutmeg, which is round and hollow, containing the honey in a bag. Several of these cells are joined together, in such a manner, that the whole appears like a cluster of grapes. The females, which have the appearance of wasps, are very few, and their eggs are laid in cells, which the rest soon cover over with wax. It is uncertain whether they have a queen or not; but there is one much larger than the rest, without wings, and without hair, and all over black, like polished ebony. This goes and views all the works, from time to time, and enters into the cell, as if it wanted to see whether every thing was done right; in the morning, the young humble bees are very idle, and seem not at all inclined to labor, till one of the largest, about seven o'clock, thrusts half its body from a hole designed for that purpose, and seated on the top of the nest, beats its wings for twenty minutes successively, buzzing the whole time, till the whole colony is put in motion. The humble bees gather honey, as well as the common bees; but it is neither so fine, nor so good, nor the wax so clean, or so capable of fusion.

Beside the bees already mentioned, there are various kinds among us, that have much the appearance of honey makers, and yet make only wax. The wood bee, or carpenter bee,[2] is seen in every garden. It is rather larger than the common queen bee; its body of a bluish black, which is smooth and shining. It begins to appear at the approach of spring, and is seen flying near walls exposed to a sunny aspect. This bee makes its nest in some piece of wood, which it contrives to scoop and hollow for its purpose. This, however, is never done in trees that are standing, for the wood it makes choice of is half rotten. The holes are not made directly forward, but turning to one side, and have an opening sufficient to admit one's middle finger; whence runs the inner apartment generally twelve or fifteen inches long. The instruments used in boring these cavities are their teeth; the cavity is usually branched into three or four apartments; and in each of these they lay their eggs, to the number of ten or twelve, each separate and distinct from the rest. The egg is involved in a sort of paste, which serves at once for the young animal's protection and nourishment. The grown bees, however, feed upon small insects, particularly a louse, of a reddish brown color, of the size of a small pin's head.

Mason bees[3] make their cells with a sort of mortar made of earth, which they build against a wall that is exposed to the sun. The mortar, which at first is soft, soon becomes as hard as stone, and in this their eggs are laid. Each nest contains seven or eight cells, an egg in every cell, placed regular-

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[1] *Bombus.* [2] *Xylocopa.* [3] *Odynerus.*

ly one over the other. If the nest remains unhurt, or wants but little repairs, they make use of them the year ensuing; and thus they often serve three or four years successively. From the strength of their houses, one would think these bees in perfect security; yet none are more exposed than they. A worm with very strong teeth is often found to bore into their little fortifications, and devour their young.

THE CATERPILLAR.

Though the caterpillar is not a perfect insect, but only a form in which an insect appears in one stage of its existence, and is always destined to assume some other form, yet it is sufficiently interesting to us in this state, to warrant some particular notice of its characteristics.

The body of the caterpillar, when anatomically considered, is found composed of rings, whose circumference is pretty near circular or oval. They are generally twelve in number, and are all membranaceous; by which caterpillars may be distinguished from any other insect that nearly resembles them in form. The head of the caterpillar is connected to the first ring by the neck, which is generally so short and contracted that it is scarcely visible. All the covering of the head in caterpillars seems to consist of shell; and they have neither upper nor under jaw, for they are both placed rather vertically, and each jaw armed with a large thick tooth, which is singly equal to a number. With these the animals devour their food in such amazing quantities; and, with these, some of the kind defend themselves against their enemies. Though the mouth be kept shut, the teeth are always uncovered; and while the insect is in health, they are seldom without employment. Whatever the caterpillar devours, these teeth serve to chop into small pieces, and render the parts of the leaf fit for swallowing. Many kinds, while they are yet young, eat only the succulent part of the leaf, and leave all the fibres untouched; others, however, attack the whole leaf, and eat it clean away. One may be amused, for a little time, in observing the avidity with which they are seen to feed; some are seen eating the whole day; others have their hours of repast; some choose the night, and others the day. When the caterpillar attacks a leaf, it places its body in such a manner, that the edge of the leaf shall fall between its feet, which keeps

it steady while the teeth are employed in cutting it; these fall upon the leaf, somewhat in the manner of a pair of gardener's shears; and every morsel is swallowed as soon as cut. Some caterpillars feed upon leaves so very narrow, that they are not broader than their mouths; in this case, the animal is seen to devour it from the point, as we would eat a radish.

As there are various kinds of caterpillars, the number of their feet is various; some having eight, and some sixteen. Of these feet, the six foremost are covered with a sort of shining gristle; and are therefore called the shelly legs. The hindmost feet, whatever be their number, are soft and flexible, and are called membranaceous. Caterpillars also, with regard to their external figure, are either smooth or hairy. The skin of the first kind is soft to the touch, or hard, like shagreen; the skin of the latter is hairy, and, as it were, thorny; and generally, if handled, stings like nettles.

Caterpillars, in general, have six small black spots placed on the circumference of the fore ring, and a little to the side of the head. Three of these are larger than the rest, and are convex and transparent; these Reaumur takes to be the eyes of the caterpillar; however, most of them have very little occasion for sight, and seem only to be directed by their feeling.

But the parts of the caterpillar's body which most justly demand our attention are the stigmata, as they are called; or those holes on the sides of its body, through which the animal is supposed to breathe. All along this insect's body, on each side, these holes are easily discoverable. They are eighteen in number, nine on a side, rather nearer the belly than the back; a hole for every ring, of which the animal's body is composed, except the second, the third, and the last. These oval openings may be considered as so many mouths, through which the insect breathes; but with this difference, that as we have but one pair of lungs, the caterpillar has no less than eighteen. It requires no great anatomical dexterity to discover these lungs in the larger kind of caterpillars; they appear, at first view, to be hollow cartilaginous tubes, and of the color of mother-of-pearl. These tubes are often seen to unite with each other; some are perceived to open into the intestines; and some go to different parts of the surface of the body. That these vessels serve to convey the air, appears evidently from the famous experiment of Malpighi; who, by stopping up the mouths of the stigmata with oil, quickly suffocated the animal, which was seen to die convulsed the instant after. In order to ascertain his theory, he rubbed oil upon other parts of the insect's body, leaving the stigmata free; and this seemed to have no effect upon the animal's health, but it continued to move and eat as usual; he rubbed oil on the stigmata of one side, and the animal underwent a partial convulsion, but recovered soon after. However, it ought to be observed, that air is not so necessary to these as to the nobler ranks of animals, since caterpillars will live in an exhausted receiver for several days

together; and though they seem dead at the bottom, yet, when taken out recover, and resume their former vivacity.

If the caterpillar be cut open longitudinally along the back, its intestines will be perceived running directly in a straight line from the mouth to the anus. They resemble a number of small bags opening into each other, and strengthened on both sides by a fleshy cord, by which they are united. These insects are, upon many occasions, seen to cast forth the internal coat of their intestines with their food, in the changes which they so frequently undergo. But the intestines take up but a small part of the animal's body, if compared to the fatty substance in which they are involved. This substance changes its color when the insect's metamorphosis begins to approach; and from white it is usually seen to become yellow. If to these parts we add the caterpillar's implements for spinning (for all caterpillars spin at one time or another,) we shall have a rude sketch of this animal's conformation.

The life of a caterpillar seems one continued succession of changes; and it is seen to throw off one skin only to assume another; which also is divested in its turn; and thus for eight or ten times successively.

How laborious soever this operation may be, it is performed in the space of a minute; and the animal, having thrown off its old skin, seems to enjoy new vigor, as well as to have acquired coloring and beauty. Sometimes it happens that it takes a new appearance and colors very different from the old. Those that are hairy still preserve their covering, although their ancient skin seems not to have lost a single hair; every hair appears to have been drawn, like a sword from the scabbard. The fact, however, is, that a new crop of hair grows between the old skin and the new, and probably helps to throw off the external covering.

The caterpillar having in this manner continued for several days feeding, and at intervals casting its skin, begins at last to prepare for its change into an aurelia or pupa.

Preparatory to this important change, the caterpillar most usually quits the plant or tree on which it fed; or at least attaches itself to the stalk or the stem, more gladly than the leaves. It forsakes its food, and prepares, by fasting, to undergo its transmutation.

Those of them which are capable of spinning themselves a web, set about this operation; those which have already spun, await the change in the best manner they are able. The web or cone, with which some cover themselves hides the aurelia contained within from the view; but in others, where it is more transparent, the caterpillar, when it has done spinning, strikes in the claws of the two feet under the tail, and afterwards forces in the tail itself by contracting those claws, and violently striking the feet one against the other. If, however, they be taken from their web at this time, they appear in a state of great languor; and, incapable of walking, remain on that spot where they are placed. In this condition they remain one or two days, somewhat in the manner they made preparations for changing

their skin. They then appear with their bodies bent into a bow, which they now and then are seen to straighten; they make no use of their legs; but, if they attempt to change place, do it by the contortions of their body

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THE BUTTERFLY.

The number of these beautiful animals is very great; and though Linnæus has reckoned up above seven hundred and sixty different kinds, the catalogue is still very incomplete. Every collector of butterflies can show undescribed species; and such as are fond of minute discovery, can here produce animals that have been examined only by himself. In general, however, those of the warmer climates are larger and more beautiful than such as are bred at home.

The wings of butterflies, as was observed, fully distinguish them from flies of every other kind. They are four in number; and though two of them be cut off, the animal can fly with the two others remaining. They are, in their own substance, transparent; but owe their opacity to the beautiful dust with which they are covered; if we regard the wing of a butterfly with a good microscope, we shall perceive it studded over with a variety of little grains of different dimensions and forms, generally supported upon a footstalk, regularly laid upon the whole surface. The wing itself is composed of several membranes, which render the construction very strong, though light; and though it be covered over with thousands of these scales or studs, yet its weight is very little increased by the number. The animal is with ease enabled to support itself a long while in the air, although its flight be not very graceful. When it designs to fly to a considerable distance, it ascends and descends alternately; going sometimes to the right, sometimes to the left, without any apparent reason. Upon closer examination, however, it will be found that it flies thus irregularly in pursuit of its mate; and as dogs bait and quarter the ground in pursuit of their game, so these insects traverse the air, in quest of their mates, whom they can discover at more than a mile distance.

This tribe of insects has been divided into diurnal and nocturnal flies; or, more properly speaking, into butterflies and moths; the one flying only by day, the other most usually on the wing in the night. They may be easily distinguished from each other, by their antennæ or feelers; those of the butterfly being clubbed, or knobbed at the end; those of the moth, tapering finer and finer to a point. To express it technically, the antennæ of butterflies are clavated; those of moths are filiform.

THE SWALLOW-TAILED BUTTERFLY,[1]

Is reckoned the most superb of the British species. It is not widely diffused, but occurs in the New Forest, and near Beverly and Bristol. The wings are tailed, with both surfaces alike; yellow with a brown border, in which are yellow lunules; the angle of the tail is fulvous. The larvæ feed on umbelliferous plants; the caterpillar is green, banded with black, marked with a row of red spots. There are two broods, of which the first appears in May, having all the winter been in the pupa state; the second comes forth in August.

THE PAINTED LADY BUTTERFLY[2]

Is a species not very common. In some seasons, these insects appear in considerable numbers, and then again are not seen for several years. In point of beauty, this has the highest claim of all; its wings are indented,

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[1] *Papilio machaon*, Lin.

[2] *Vanessa urticæ*, Lin.

orange above, variegated with black and white beneath; four eyes on the posterior pair. Its larva feeds on nettles, thistles, docks, and other herbage,

by the sides of ditches, and changes its state about the middle or latter end of July.

THE SPHINX CAROLINA.

The larva of this moth is green, with lateral spiracles on every segment, surrounded by a purple ring; and the caudal spine is of the same color. When full grown, they are thickest in the middle; their horn or tongue is generally curled; and they have two feelers. Their wings are clouded, entire, and the posterior margin is dotted with white; the abdomen has five pairs of fulvous spots.

In America, they are sometimes distinguished by the name of tobacco moths, on account of their feeding entirely on that plant.

THE DEATH'S HEAD MOTH.[1]

This beautiful insect is one of the rarest of the moths, and is found only in warm places. It alights on particular flowers, among which are the jasmine, the potato, and the wild solanums. Of its four wings, the feathers of which are particularly fine and glossy, the upper pair are of a rich dark gray, marked with white and orange; while the under pair are of a glowing orange, with irregular black bands. The upper part of the abdomen is orange, barred with black. The most remarkable part of this insect, however, is a sort of representation of a death's head, which appears on the superior portion of the thorax. This is formed by a large irregular gray patch, having two black dots near the middle.

THE SILK-WORM MOTH.[2]

The silk-worm came originally from the northern provinces of China Before the introduction of the animal into Europe, silk was sold for more than its weight in gold. The Greek missionaries in the reign of Justinian transported the ova of the silk-worm in reeds, for the first time, to Constantinople. The cultivation of this useful animal was thus extended to Southern

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[1] *Acherontia atropos*, Lin. [2] *Bombyx mori*, Lin

Europe, and was afterwards introduced into Spain and Africa, by the Arabs. In the time of the Crusades, the insect passed from the Morea into Sicily and Calabria. From Calabria, the ova and the mulberry were brought to France by some of the followers of Charles VIII., on his conquest of Naples, and the cultivation of this insect was afterwards encouraged and patronized by Sully, as an important branch of national industry.

The mode of feeding and managing the silk-worm, and procuring its delicate web, is detailed in numerous works both scientific and economical. The caterpillar feeds upon the leaves of the mulberry. After remaining in this state about six weeks, during which the caterpillar changes its skin four times, the animal ceases to feed, and begins to form an envelope or cocoon of silken fibres in some convenient spot, producing the minute threads, till it has formed an oval, yellow case or ball, about the size of a pigeon's egg, in which it changes to a chrysalis. In this state it remains for about fifteen days, when the perfect insect is produced. This, however, is not allowed to happen when the animals are reared for the sake of the silk, from its being observed that the animal before leaving its cocoon, discharges a colored fluid, which injures the quality. The cocoons are therefore exposed to such a degree of heat, as to kill the inclosed animals, a few only being saved to keep up the breed.

The moth, when produced, is very short lived, breeding soon after the exclusion, and perishing after the deposition of the ova. The length of the silken thread when unrolled, is said to be from three hundred to five hundred yards in length, and this thread is composed of two united threads, agglutinated together.

DIVISION IV.—RADIATA.

This division of the animal kingdom comprehends a great number of beings, of organization more simple than the preceding classes. However different otherwise in their structure or form, they seem (according to Cuvier) to correspond, in the character of having all their parts disposed around a common axis, in two or more rays, or in two or more lines extending from one extremity to the other. Even the intestinal worms have at least two

tendinous lines or nervous threads, arising from a circle round the mouth; many have four suckers around a prominence, in the form of a proboscis; and, notwithstanding some irregularities, there is always found in the animals arranged under this division, traces of a radiated form, indistinctly marked in some, but in others, such as the *Asteriæ*, the *Echini*, and the *Polypi*, strikingly perceptible. The nervous system in the animals of this division is never very evident; and of a circulation by vessels, as in the previous classes, there is no trace. The *Holothuriæ* have two vascular appendages, one attached to the intestines, and corresponding to the organs of respiration, and the other serving for the inflation of organs analogous to feet. The last of these only appears distinctly in the *Echini* and the *Asteriæ;* in the gelatinous substance of the *Medusæ* are seen tubes more or less complicated, connected with the intestinal canal; but none of the appearances are conceived to have any strong analogy with the circulating vessels of the higher animals. Some genera, such as the *Holuthuria Echinus*, and many intestinal worms, have a mouth and anus, with a distinct intestinal canal; others have an internal pouch, with only one opening, serving the purposes of a mouth and anus; but in the greater number there is only to be discovered a hollow cavity in the substance of the body, opening sometimes by many suckers or pores. Finally, in the lowest races of the animal kingdom, even this simple organization disappears, and nutrition seems to be accomplished by absorption, in the manner of vegetables. In regard to their reproduction, sexes have been observed in many of the intestinal worms; others are hermaphrodite and oviparous; and some seem to be reproduced by *geminæ*, or buds, or simply by a division of their parts. The conglomerated or compound arrangement of animals, of which some examples occur among the Mollusca, is a common circumstance among the Radiated animals, particularly among those named Polypi; and from their aggregation and expansion into trunks and branches of various forms, joined to the simplicity of the organization in the greater number of the species, originated the term *Zoophyta*, or *animal plants*. The radiated disposition of their organs, like the petals which form the corolla of a flower, seems also to have led to this idea. Indeed, the boundary line between the animal and vegetable kingdom seems at first view to be but indistinctly drawn; and there are objects in both which even accurate observers are scarcely able to decide, whether they belong to the one or the other. In the simplest being, however, the globular form, as Carus observes, is the characteristic of animality; and minute microscopical investigation detects in the lowest of the animal races a semifluid mass, composed of minute globules suspended in slimy fluids while in the organization, the cellular texture always predominates. To this characteristic form, the most imperfect animated beings add a sensibility to the faintest impressions, that of light, for example, the power of voluntary motion either in the animal or its parts, and the absorption of food into an internal cavity. In the more perfect animals, the osseous skeleton serves to cover and protect the centra

nervous masses, and to support the organs of motion, but in the simple structure of the lower animals, the frame work serves only the last of the purposes, being either external to the animal substances, as in the *Tubiporæ* and Sponges, or internal, as in the *Sertulariæ*, *Gorgoniæ*, &c. The animals of this division have been arranged in five classes, viz.

I. Echinodermata, or animals with a crustaceous covering, distinct intestinal canal, and organs for generation, respiration, and partial circulation.

II. Entozoa, or intestinal worms; elongated and depressed animals, which have no organs for respiration or circulation.

III. Acalepha. Animals of a circular and radiated form, and destitute of circulating and respiratory organs.

IV. Polypi, or Zoophytes; comprehending all those small, gelatinous, and compound or aggregated animals which have a mouth surrounded by tentacula, and conducting into a simple stomach.

V. The Infusoria, or those smaller beings only known through the medium of the microscope, which are found in stagnant waters. The greater part of these have a gelatinous body, and are destitute of viscera, though some of the species possess visible organs of movement, and a stomach.

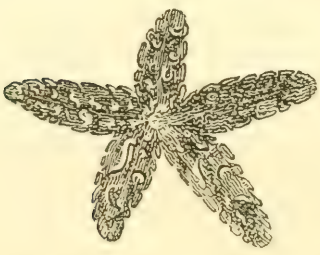
CLASS X.—ECHINODERMATA.

Body suborbicular, with a coriaceous or crustaceous covering, radiated, destitute of head, eyes, and articulated feet; mouth inferior, simple or multiform; organs of digestion compound; exterior tubes or pores for respiration.

The animals of this class were arranged by some of the older naturalists among the testaceous Mollusca; by others among the Zoophytes; while others considered them as allied to the Crustacea. The more modern writers, however, founding their divisions on the comparative structure of the animals, as well as their external characters, have placed the animals of this group in a separate class, Cuvier making them the first class of his great division of Zoophytes, or animals with prehensile and retractile tentacula, and Lamarck placing them also in a separate class, under the title of Radiaria. In this class the radiated structure, both externally and internally, forms a distinctive character. The body is generally orbicular, covered with a skin, or a crustaceous or calcareous covering, and often armed with tubercles or jointed and moveable spines. The interior cavity is provided with distinct viscera, and a kind of vascular system maintains a communication with the different parts of the intestine, and with the organs of respiration. These organs consist in pores or orifices, or exterior tubes for the passage of the water. The animals of this class are destitute of head, eyes, and arti-

culated feet; their nervous system is indistinctly traced; and their organs of motion are extremely imperfect. The Echinodermata are all marine animals, and have the faculty, like many other of the more imperfect animals, of speedily regenerating parts of their bodies which have been broken or separated. Lamarck divides the class into three sections, viz. Fistulides, Echinides, and Stellerides, while Cuvier arranges it into two orders, the first including those which possess numerous membranous tentacula, serving as organs of motion, and the second those which are destitute of these organs. Latreille makes two classes of the same animals, under the names of Holothurida and Echinoderma. The arrangement of Lamarck is chiefly followed; but we have added a fourth section, comprising, under the title of Crinoidæ, given to them by Mr. Miller, the animal remains known by the name of Encrinites.

THE SEA STAR,



Called also the star-fish; these curious animals inhabit the sea, and are generally found on the sand, or among rocks, considerably below low water mark. They are covered with a coriaceous crust, and have five or more rays proceeding from a centre, in which is situated the mouth. A prodigious number of tentacula, or short fleshy tubes, which seem at once calculated to catch prey, and to anchor the animal to the rocks, proceed from each ray. The mouth is armed with long teeth, for the purpose of breaking the shells on which the animals feed. The animal breathes by means of gills. The common, or five-rayed star-fish,[1] which is the species here represented, has five angular rays, with prickly protuberances at the angles. When alive, it is usually of a brownish white color. In one of these, which he kept for some time alive, Mr. Bingley observed more than four thousand tentacula, on the under sides of the rays.

---

[1] *Asterias rubens*, Lin.

In summer, when the water of the sea is warmed by the heat of the sun they float upon the surface, and in the dark they send forth a kind of shining light, resembling that of phosphorus.

They are often seen fastened to the rocks and to the largest sea shells, as if to derive their nourishment from them. If they be taken and put into spirit of wine, they will continue for many years entire; but if they be left to the influence of the air, they are, in less than four and twenty hours, melted down into limpid and offensive water.

In all of this species, none are found to possess a vent for their excrements, but the same passage by which they devour their food serves for the ejection of their fœces. These animals, as was said, take such a variety of figures, that it is impossible to describe them under one determinate shape; but, in general, their bodies resemble a truncated cone, whose base is applied to the rock to which they are found usually attached. Though generally transparent, yet they are found of different colors, some inclining to green, some to red, some to white, and some to brown. In some, their colors appear diffused over the whole surface; in some, they are streaked, and in others often spotted. They are possessed of a very slow, progressive motion, and, in fine weather, they are continually seen stretching out and fishing for their prey.

CLASS XI.—ENTOZOA.

Body soft, elongated, naked in almost all, without head, eyes, or feet; mouth formed of one or many suckers; no tentacula or organs of respiration; intestinal canal in some scarcely perceptible.

The intestinal worms are remarkable for existing and propagating only in the interior of animals. There is scarcely an animal in which there are not found some species of parasitical worm; and they occur not only in the alimentary canal and the vessels which communicate with it, such as the hepatic vessels, but even in the cellular tissue, in the liver, and the brain. The difficulty of conceiving how they appear in these parts, joined to the observation, that they are never found but in living bodies, had led some naturalists to suppose that they were engendered spontaneously. It is, however, now ascertained, not only that the greater part produce ova or living young, but that many have separate sexes, and couple as ordinary animals. These worms or ova, however, must be of extreme minuteness to be able to pass through channels so narrow.

The intestinal worms being destitute of trachea, bronchiæ or any other organ of respiration, must necessarily receive oxygen through the medium

of the animals which they inhabit. No trace of circulating vessels has been detected; and the vestiges of nerves are so obscure, that many naturalists have doubted their existence. When these characters are found in an animal similar in form to those of this class, it is arranged along with this division, though it does not inhabit the interior of another species.

Linnæus arranged this group of animals in a division of his great class *Vermes*, including the genera *Lumbricus*, *Sipunculus*, *Fasciola*, *Gordius*, *Ascaris*, *Hirudo*, and *Myxine*. Subsequent writers, such as Pallas, Muller, Blumenbach, Bloch, and Gœze, established new genera, or added new species; and more lately, Cuvier, Lamarck, Rudolphi, and Bremser, from more detailed examination of the animals, and a more intimate knowledge of their structure, have proposed arrangements better suited to the present state of the science.

M. Lamarck divides the class into three orders, viz. Hispidæ, Rigidulæ, and Mollassæ, the last of which is subdivided into three sections. In the method of Cuvier, the class forms two orders, Les Cavitaires, and Les Parenchymateaux, according to the structure of their body. And Rudolphi, in his work, entitled *Entozorum, sive Vermium Intestinorum Historia Naturalis*, arranges them into five orders, viz. 1. Nematoides; body elongated, cylindrical, elastic. 2. Acanthocephalus; body cylindrical, slightly elastic, with anterior simple or compound, prolongation covered with a series of bent and retractile spines. 3. Trematodes; body flattened, or slightly cylindrical, soft, and provided with pores for suction. 4. Cestoidea; body elongated, flattened, soft, of one or many pieces. 5. Cisticorus; body terminated by or adhering to a vesicle. This arrangement includes besides, three isolated genera, which would not admit of being placed under the previous heads. Latreille, in his *Familles du Règne Animal*, disposes the intestinal worms chiefly after the methods of Rudolphi and Cuvier; combining in his sketch of the class, the general views of these excellent naturalists. As the method of Latreille is here followed with one exception, it is not necessary to repeat the characters of the subdivisions. That branch of natural science which treats of intestinal worms, is generally termed *Helminthology*.

CLASS XII.—ACALEPHA.

Body gelatinous, circular, and radiated, with the skin soft and transparent, susceptible of contraction and dilatation.

The class Acalepha of Cuvier embraces the *Radiaires*, *Medusaires* and *Anomales* of Lamarck, and besides includes the genus *Actinia*, which the latter

author had placed in a division of his *Echinodermata*. The animals of this class are either fixed by a base, or float freely in the ocean, and many are suspended in the water by the specific lightness of some of their parts, or by the air contained in their bodies. Their substance is gelatinous, without apparent fibres, though susceptible of contraction and dilatation. The sort of vessels, found in some, are merely canals in the gelatinous substance, connected with the stomach; none of their movements seem connected with muscular action; there is no proper cavity for containing organs; the mouth or the suckers, or tentacula in the centre of the inferior surface is unprovided with hard parts; and the stomach, or the organ of digestion, and nutrition, is a simple sac without outlet. Between this sac and the external is a complicated but obscure organization. The Acalepha shine during the night with a luminosity. Many species are ornamented with lively colors. They are common in all seas. Cuvier divides the class into two orders, viz. 1. Those where the body is fixed by a base either permanently or occasionally; and 2. Those which float freely in the ocean.

CLASS XIII.—POLYPI.

Gelatinous animals with elongated, contractile body, and an alimentary sac with one opening; mouth distinct and terminal, surrounded with tentacula or radiated lobes; the greater number adhering together, and forming compound animals.

The class of Polypi or Zoophytes, is one of the largest and most singular of the Animal Kingdom.

Nearly at the lowest step in the animal scale, many of them have the form of plants, accompanied by the simplest organization of parts for a living being capable of reproduction. Destitute of head and eyes, and having no organs for circulation, respiration or locomotion, the body of the Polypus appears only as a homogeneous substance, constituted of gelatinous and irritable cellular tissue, in which the fluids essential to life move sluggishly. All are, however, furnished with an internal cavity or stomach, with faint traces in some of hollow canals and ovaries. The body is generally cylindrical or conical, gelatinous or transparent; and the mouth surrounded by tentacula, varying in number and form, serves also for arms. Many of the polypi have the principle of life so diffused in their structure, that portions cut from the individual soon acquire, in the proper element, all the characters of the per-

fect animal. Most of the same species, besides, form compound animals, adhering to one another by lateral appendages, or by their posterior extremity, and participate in a common life without ceasing to enjoy their individual and independent existence. The mode of reproduction in many individuals of this class is unknown. In general, it may be remarked, that many are conceived to be gemmiferous, or to extend the race by buds in the manner of plants, while others propagate the species by means of ova. In the lowest of the races, the distinctive characters of animal life are so faintly drawn, that with difficulty can many of these be distinguished from the Cryptogamic families of the Vegetable Kingdom. Many of the Polypi have the faculty of forming fixed envelopes, more or less solid, in which they reside. The singular diversity of this envelope, in its own substance inorganic and calcareous, and its accumulation in immense masses in the seas of warm countries, by the combined operation of these animals, is not the least interesting fact in their history. They appear in these countries to multiply with such facility, and in such great abundance, as to become powerful agents in the modification of the surface occupied by the ocean. Islands are reared, and coasts extended, by the incessant multiplication of these animals. M. Lamarck conjectures that even the calcareous mountains and strata of the present surface of the globe may have been formed in the revolution of ages by Polypi; and that future changes in this surface, and in the level of the ocean, are in course of preparation by these minute animals.

The animals of this class were regarded by the older naturalists as stony vegetables, or vegetating stones, and a number of theories were framed to explain their formation and growth. Their animal nature was first conjectured by Imperati, in 1699, proved in 1727, by Paysonnel, and confirmed in 1740, by the observations of Trembley upon the Hydræ. From this period, the true knowledge of these animals continued to increase, chiefly through the researches of Ellis. Marsigli, Baster, Donati, Boccone, Degeer, Reaumur, Jussieu, and Cavolini, followed in the path traced out by Ellis and Linnæus, with the same success which attended his investigations of the other objects of nature, arranged the whole in his class Vermes, making them an order under the name of *Lithophyta*. The classification of this great naturalist, who fixed the characters of the divisions, and described the greatest number of species, forms the basis of what has since been done by Pallas, Bruguierè, and Lamarck. Cuvier, in his *Règne Animal*, divides the Polypi into two orders — the first comprehending the naked Polypi; and the second those which live in polypiferous masses, formed by their united labors. The second order is further subdivided into many families. Lamarck, whose system regarding these animals is followed in the present work, divides the class of Polypi into five orders.

I. Polypi Natantes. — Tentaculated polypi, united in a common fleshy body on an axis, free, and floating in the water.

II. Polypi Tubiferi.—Tentaculated polypi, united in a common fleshy body, destitute of solid internal axis, and covered with tubiform cylinders.

III Polypi Vaginati.—Tentaculated polypi, constantly fixed in an organic covering, and forming, in general, compound animals.

IV. Polypi Denudati.—Tentaculated polypi, not forming a common envelope, fixed either constantly or spontaneously.

V. Polypi Ciliati.—Polypi destitute of tentacula, but with vibratile ciliæ, at or near the mouth.

The habitations of the polypi, or the common masses formed by their united labors, are more or less calcareous or stony, from the madrepores, of a substance as consistent as shells, to the fibrous or membranous horny envelope of the sponge. Between these extremes are found every variety of consolidation and consistence; but all are formed by animals approaching to one another in their general organization. Polypi are reproduced by ova or a separation of parts, natural or accidental. Their food is chiefly animal, derived, in the case of the smaller species, from the infusory animalculæ which inhabit the waters.

CLASS XIV.—INFUSORIA.

Microscopic animals, gelatinous, transparent, polymorphous, and contractile; no distinct mouth, nor constant or determinable interior organ; generation fissiparous or gemmiparous.

The Infusory Animals, or those animalcules which have been observed in infusions of different plants, or in waters, more or less corrupted, and which are generally so minute as to require the aid of the microscope to discover them, form the last series of beings in the animal scale. The greater portion of these appear to have a gelatinous body, of extreme simplicity; but systematical writers have, also, arranged in this class, many animals much more complicated in appearance, and which resemble them only in their extreme minuteness. Of animals so minute, the organization is but imperfectly known. Destitute of a distinct mouth, and internal organ of digestion, they seem to receive nourishment by absorption in all parts of their body. They are, however, capable of contraction and voluntary motion, and their reproduction is effected by a separation of parts. Lewenhoeck and Muller first introduced these animals to the notice of naturalists, under the name of Infusoria. In Lamarck's system, they compose the first class of his Invertebral Animals; Dumeril arranges them as the fourth family of his Zoophytes; and Cuvier makes them the fifth class of Zoophytes or those animals

which he has arranged as the fourth great division of the Animal Kingdom Lamarck divides the Infusoria into two orders:

I. Infusoria Appendiculata. — With projecting parts at their exterior, as hairs, horns, or a tail.

II. Infusoria Nuda, or naked Infusoria. — Destitute of exterior appendages.

GLOSSARY.

Accipitres; the Rapacious class of birds, according to the Linnæan system.
Ambulatory: a tribe of walking birds, with three distinct toes before, and one behind
Anal; in fishes, a name applied to the fin near the anus.
Anseres; the class of swimming birds.
Antennæ; the horns of an insect.
Apodal; an order of fishes with bony gills and no ventral fins.
Aptera; an order of insects without wings.
Bellucæ; an order of mammalia, having obtuse teeth in each jaw, and undivided hoofs.
Bivalve; a shell consisting of two parts, connected by a hinge.
Branchiæ; the gills of a fish.
Bruta; an order of mammalia, entirely destitute of front teeth.
Canine teeth; two sharp-pointed teeth in each jaw, in man, called the eye-teeth.
Cæcum; one of the lower intestines.
Caruncle; a fleshy protuberance.
Carinated; ridged like the keel of a ship.
Cere; the membrane covering the bill of a bird.
Ciliary; belonging to the eyelids.
Clavicle; the collar bone.
Coleopterous; a name applied to insects with crustaceous coverings to their wings.
Coverts; in a bird, the feathers lying about the base of the wing.
Crustaceous; covered with a horny shell
Cuneiform; wedge-shaped.
Cuspid; ending in a point.
Dentated; furnished with teeth.
Digitated; furnished with fingers or toes.
Diptera; a class of insects with two wings.
Distichous; disposed in two rows.
Emarginate; notched at the end.
Elytra; the crustaceous coverings to the wings of coleopterous insects.
Entomostraca; a tribe of animals inhabiting the water, and which unite the characters of the insect and the oyster.
Exuviæ; the slough or cast skin of a reptile.
Femur; the thigh.
Feræ; a class of mammalia with six front teeth in each jaw, and one canine tooth on each side in both jaws.
Filiform; thread-shaped.
Gallinaceous; a name applied to those birds akin to the domestic fowl.
Glires; a class of mammalia with two long front teeth in each jaw, and no canine teeth.
Grallæ; the tribe of birds which wade in the water, but do not swim.
Gressorial; a term applied to the feet of walking birds, which have the fore toes connected, but without a membrane.
Hemiptera; a tribe of insects half crustaceous, half membranous.
Hyaline; resembling glass.
Imbricated; lying over each other like the tiles on a roof.

Incisors; the front or cutting teeth.
Inguinal; situated near the organs of generation.
Invertebrated; without a backbone.
Iris; the colored ring of the eyeball.
Larvæ; a term applied to one of the incipient stages of an animal.
Lepidopterous; insects are Lepidopterous which have four wings covered with fine scales, apparently like powder or meal.
Lithophyte; a stony substance which has a vegetable appearance.
Lore; a bare streak on the side of a bird's head, from the beak to the eye.
Lobated; having the toes or claws furnished with a slitted membrane.
Lunated; shaped like a half-moon.
Mammalia; that class of animals which suckle their young.
Mammæ; the breasts.
Mandible; the jaw or bill.
Marsupial; furnished with a bag or pouch on the belly, like the opossum.
Maxillary; belonging to the jaw.
Molar; the large or grinding teeth.
Molluscous; a term applied to those animals whose bodies are soft, without an internal skeleton, or articulated covering.
Neuropterous; a term applied to insects which have membranous, transparent wings, in which the membranes cross each other like network.
Occiput; the hind head.
Ocellated; marked with spots resembling little eyes.
Operculum; a lid or cover.
Palmated; webbed or having the shape of a band.
Palpi; the feelers of an insect.
Papillous; covered with fleshy warts or points.
Passerine; an order of birds comprising those which sing.
Pectinated; shaped like the teeth of a comb.
Pectoral; pertaining to the breast.
Pelvis; the cavity comprising the lower part of the abdomen.
Pinnated; having the toes or claws separate, but furnished with lateral membranes.
Pisciform; having the shape of a fish.
Prehensile; having the power of seizing or taking hold.
Primary feathers; the outer feathers of the wing.
Process; a fleshy or corneous protuberance.
Protractile; capable of being stretched forward.
Pupa; the chrysalis of an insect.
Rapacious; an order comprising the birds of prey.
Retractile; having the power of drawing inwards.
Sagittal; arrow-shaped.
Scapulars; the shoulder feathers of a bird.
Sebaceous; fatty.
Setaceous; bristly.
Secondaries; the middle feathers of the wing.
Speculum; a colored spot on the back of the wing.
Sternum; the breast bone.
Subcaudal; under the tail.
Subulate; curved like a shoemaker's awl.
Tarsus; (in ornithology,) that part of the leg between the thigh and the claw.
Tentacula; the feelers of an insect.

Testaceous; pertaining to the *testacea,* or animals covered with a hard shell like the tortoise.

Tertiaries; the interior feathers of the wing, or those next the body.

Tetradactyle; furnished with four toes or claws.

Triquetrous; three-sided.

Univalve; a shell complete in a single piece.

Unguiculated; furnished with nails or claws.

Vent; (in birds,) the under part of the rump.

Ventral; belonging to the belly.

Waders; those birds which frequent the shore, but do not swim.

Wattles; the loose red flesh hanging about the neck of the turkey and some other birds.

Zoophyte; a body partaking of the nature of animals and vegetables.

Zygodactylous; having the toes disposed in pairs.

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